WESTERN GAS

April
1930

20 Cents
the Copy

A Dresser-Coupled joint is the mark of a good job well done—with minimum time and effort. It is your assurance of a strong, flexible, durable bond that will remain permanently tight under any and every condition of service.

S. R. DRESSER MFG. COMPANY
Bradford Pa.

A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES

NORDSTROM, THE PERFECT APPLICATION of a PRINCIPLE

HYDRAULIC LUBRICATION INSURES EFFECTIVE MANIPULATION

FABRICATED and LUBRICATED for LONG LIFE

WON'T LEAK, WON'T STICK; LUBRICATION DOES THE TRICK

THE VALVE CONTROLS THE FLOW; THE SCREW CONTROLS THE VALVE

THE TURN of a SCREW PUSHES LUBRICANT THROUGH

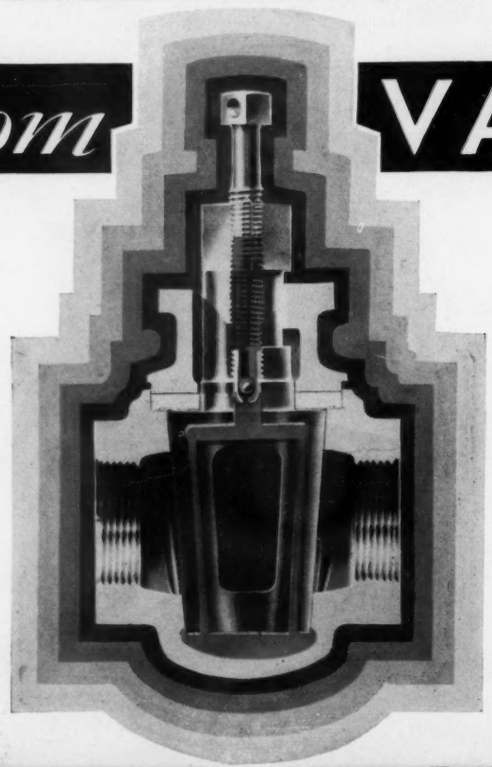
NORDSTROM'S PERFECTION IS YOUR PROTECTION

FOR THOSE WHOSE GOAL HAS BEEN CONTROL

NORDSTROM LUBRICATED ACTION is the "SEAL" of SATISFACTION

BRINGING PRESSURE to BEAR on VALVE TROUBLES

Nordstrom VALVES



For the Gas Industry

A special lubricant plus the principle of hydraulic pressure prevents leaks in Nordstrom Valves and make the valves easy to turn.

Nordstrom Valves are adapted to all services in the Gas Industry and are manufactured in sizes and types to meet your requirements.

Ask for latest Catalog.

MERCO

Specify "Merco" Lubricant

To get the most efficient service from Nordstrom Valves, always use "Merco" Lubricants. These lubricants are specially compounded and are manufactured in stick form for easy insertion in valve. The "Merco" Lubricant best adapted to your service will be gladly recommended by our engineers.

"Merco" Compound

A metallic lead seal that makes joints *permanently leak-proof*. Use it on screw thread or gasketed joints, boiler repairs, manhole plates, etc. Easily applied with a brush. May we send a free demonstration can?

MERCO NORDSTROM VALVE COMPANY

SUBSIDIARY OF THE MERRILL COMPANY

Engineers . . . Manufacturers

Atlanta: Healey Building Chicago: 176 W. Adams St. El Paso: 111 S. Virginia St. Houston: Petroleum Building New York: 11 W. 42nd St.
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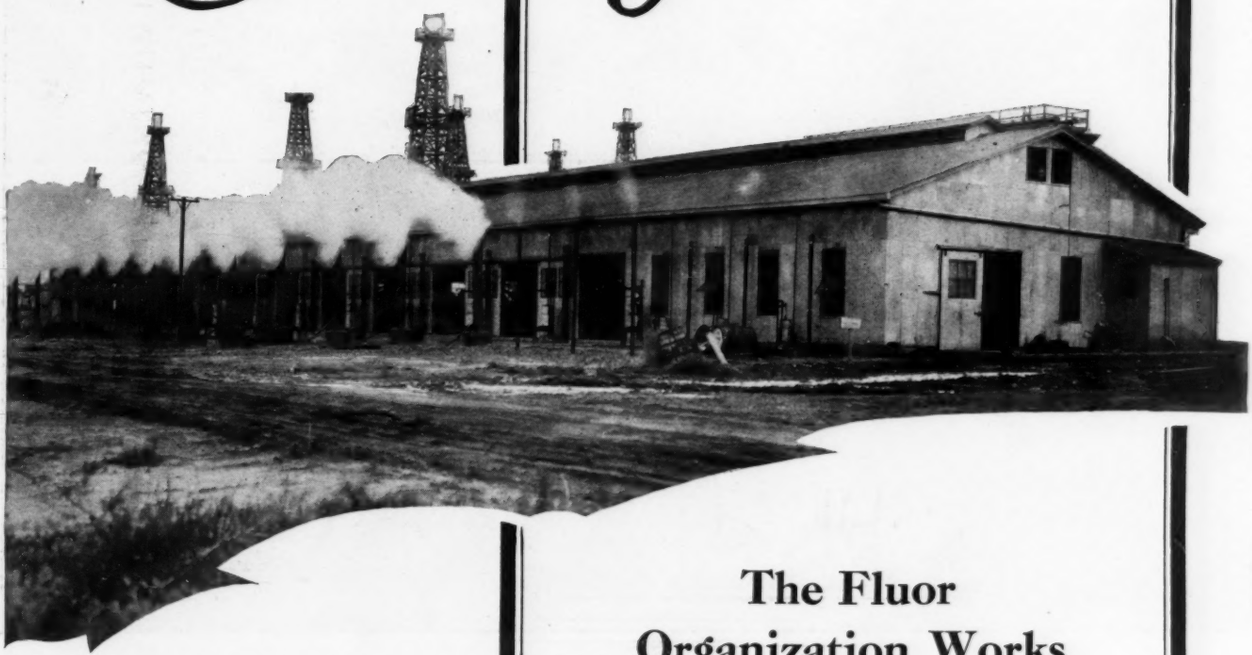
AGENCIES IN PRINCIPAL CITIES

Factories: Oakland, California and Belleville, New Jersey. *Canadian Manufacturers:* Peacock Bros., Ltd., Montreal, Cobalt, Winnipeg, Vancouver. *England:* Audley Engineering Co., Ltd., Newport, Shropshire. *Buenos Aires, Argentine:* General Electric, Soc. Anon., Victoria 618 Esq. Peru.

Contract Satisfaction



Complete new installations, or remodelling old installations on turnkey or sub-contract basis, covering—

(1) Gas compressor stations
(2) Gasoline absorption plants
(3) Boiler plants
(4) Pump stations
(5) Refinery equipment
(6) Cooling towers and atmospheric coolers
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(8) Buildings

The Fluor Organization Works *With* You

(1) Engineering Experience
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(3) Designs, Plans, Estimates
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Build Permanence Into Your Plants

THE Fluor CORPORATION, LTD.
(Successors to Fluor Construction Co.)

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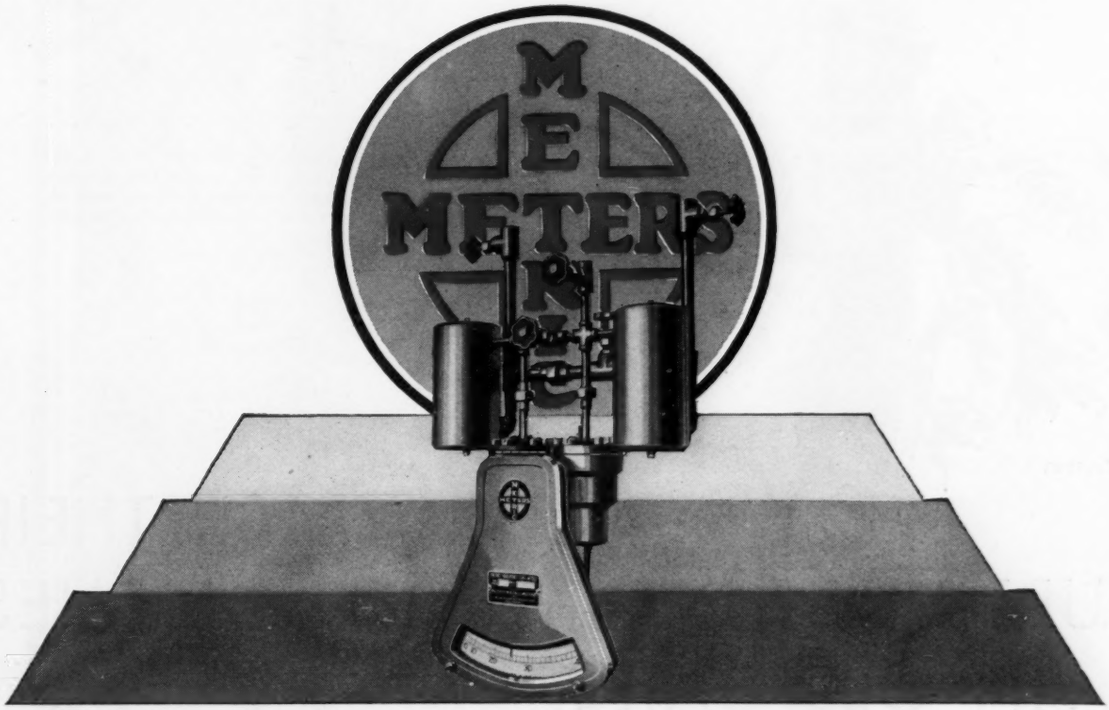
PIPE LAYER'S HEAVEN

(In the language of the pipe liner, any country that is especially easy to go through with a pipe line is known as "pipe layer's heaven.")

An old timer told us that with SMITHWelded Line Pipe and SMITHWeld Bell and Spigot and Expansion Bending Joints, all kinds of country become "PIPE LAYER'S HEAVEN."

A. O. SMITH CORPORATION, *General Offices:* Milwaukee, Wisconsin
OIL AND GAS FIELD PRODUCTS DIVISION
District Offices: New York · Tulsa · Los Angeles · Houston

SMITH*WELDED* GAS LINE PIPE



Measuring Flow Accurately—Economically

For measuring the flow ot gases and fluids accurately, meters must be sensitive to the slightest change and readily adapted to meet specific conditions. That is why Metric Indicating Flowmeters are made with interchangeable orifices — each accurate to one thousandth of an inch.

Metric Indicating Flowmeters measure the maximum flow of gas, oil, water, or air. Readings are indicated in cubic feet, gallons or barrels, per minute, per hour or per day. Special Metric orifice discs are provided so that the dials will indicate the rate of flow, without any calculations, either with flange or 2½ and 8 connections.

The dial numbers are large enough to be seen from a considerable distance. They are guaranteed to read from 0 to 10 or for any readings desired. To assure dependable service when you order new dials and orifices, the number and record ot each meter is kept in our files.

Let an American Meter Engineer cooperate with you on flow measurement. His knowledge is supported by extensive laboratory facilities and by experience practically applied in every part of the country.

For detailed information about Metric Indicating Flowmeters write for Bulletin E-3

AMERICAN METER CO. MEASUREMENT ENGINEERS CUBIC FEET

METRIC METAL WORKS
ERIE, PENNSYLVANIA
IRONCASE, TINNED STEEL CASE and ORIFICE METERS

AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
ESTABLISHED 1836

SALES · ERIE · DALLAS · TULSA · DENVER · LOS ANGELES · SAN FRANCISCO · KANSAS CITY
SERVICE · PITTSBURGH · CHICAGO · PHILADELPHIA · NEW YORK · BALTIMORE · BOSTON · ALBANY

The second of a series of advertisements by the Oklahoma Contracting Company showing the history and the development of the pipe line industry

THEY FILLED THEIR BURDGUGI FROM OPEN DITCHES . . . IN OLD BAKU

At Baku, Russia, once the sacred city of the fire worshippers, is one of the world's oldest oil fields. From the crevices of the rocks at times the gas escapes and becomes ignited, causing this locality to be known as *the Field of Fire.*

Sometimes belonging to Russia, sometimes to Persia, long before development of kerosene or lamp oil, this field was consistently developed and exploited by the government for the crude oil, which was burned for lighting in open earthenware bowls. Drawn by man or horsepower, depending upon the depth and yield of the well, the oil was brought to the surface in buckets made of goat skin.

On the Monroe-St. Louis Line . . .

An epoch in pipe line history was the construction of the Mississippi River Fuel Corporation's 22-inch natural gas line from Northern Louisiana to St. Louis. The successful completion of this line gave St. Louis natural gas for its industries, and for the first time the Richland and Monroe gas fields became accessible to an industrial market.

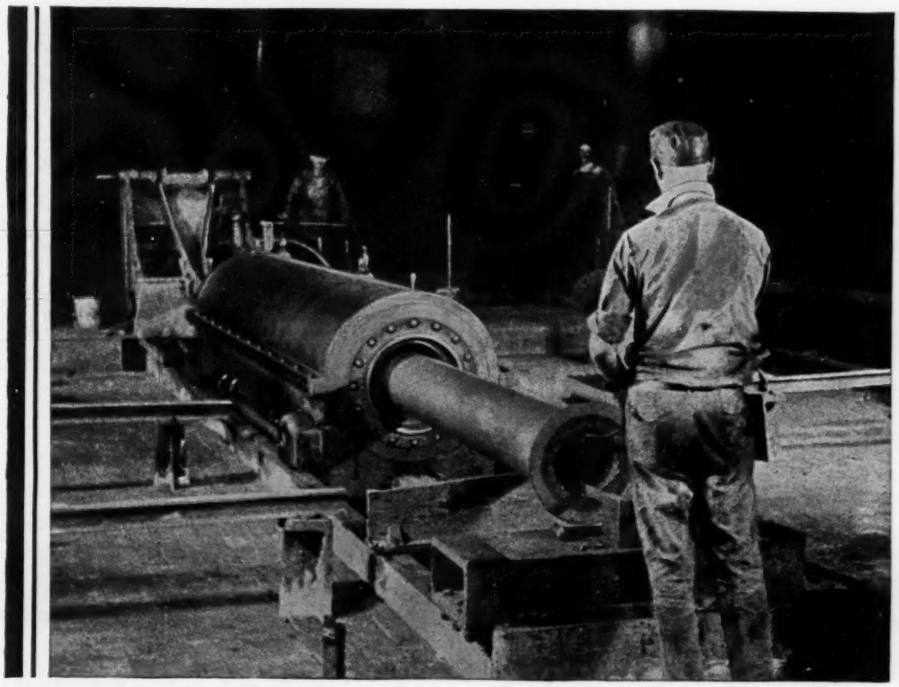
The Oklahoma Contracting Company's portion of this line was sublet from Ford, Bacon & Davis, Inc. It extended from Ten Brook, Missouri, to Tuckerman, Arkansas, . . . a distance of approximately 200 miles. Work began in April, 1929, and in spite of the unfavorable weather conditions during April and May, this contract was completed well within the specified time.

Ample modern pipe line equipment, adequate gangs of practical pipe-liners, directed by experienced executives, and a past record of achievement are the Oklahoma Contracting Company's assurance of a good line on time.

OKLAHOMA CONTRACTING COMPANY DALLAS TULSA

For transporting oil short distances, such as from the well to the open cisterns, the oil was flowed in shallow ditches. For long-distance hauling, however, the oil merchants filled their burdgugi (containers made of whole ox skins) from the ditches or the cisterns and the crude petroleum was carried across country on the backs of camels or upon high-wheeled arbens.

Modern pipe lines, installed under the direction of the Soviet government, have replaced the open ditches for transporting oil and gas in Old Baku. The patient chug-chug of booster stations can be heard through the *Field of Fire.*



The illustration shows the deLavaud machine withdrawing to permit the removal of a newly formed pipe.

Why deLavaud pipe is superior in strength and flexibility

WHY is deLavaud pipe the strongest cast iron pipe known? The answer can be found in the deLavaud machine shown above.

If you looked into the bore of this machine in operation, you would observe an accurately gauged metal mold revolving within a water-cooled jacket. When molten iron is fed into this rapidly whirling mold, it is held against the sides by centrifugal force—a force forty times greater than gravity. Gas bubbles and impurities are driven out of the metal. At the same time, the cooling action of the water jacket which encases the mold brings about a fine, even division of the iron particles.

Thus, upon close examination, you would find that deLavaud pipe metal is dense and fine-grained, free from gas bubbles and weakening impurities.

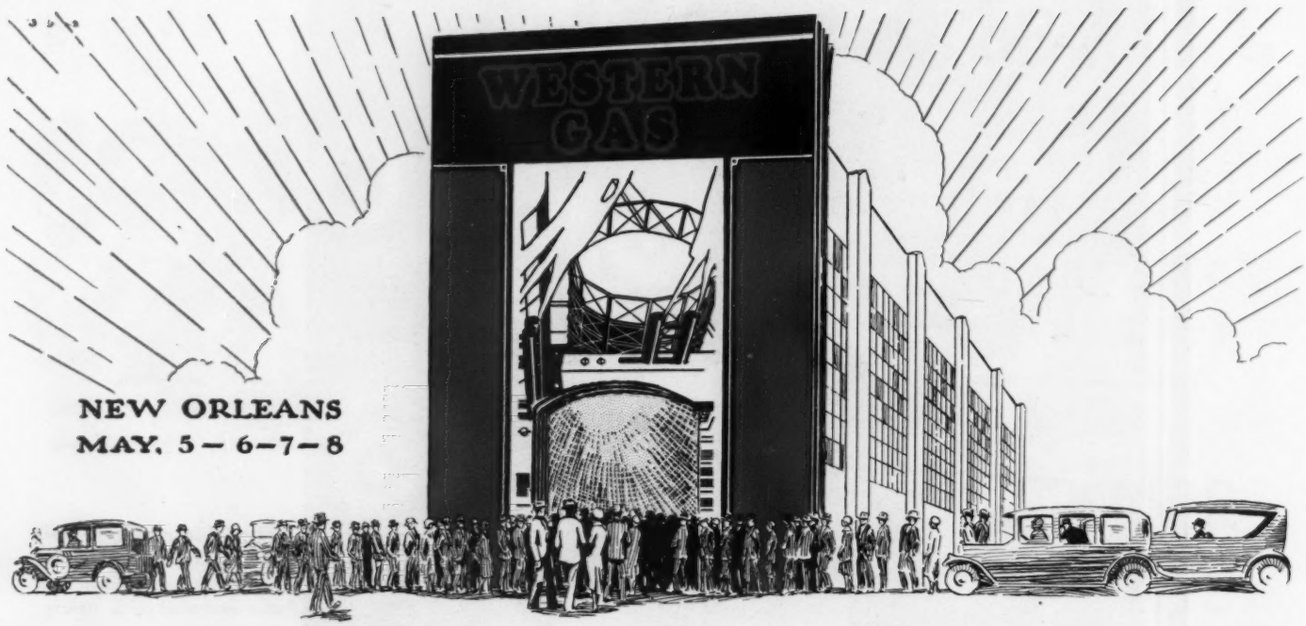
After coming from the machines, deLavaud pipe is uniformly annealed in a special annealing furnace. Here controlled heat further improves the structure of the metal, bringing about deLavaud pipe's flexibility and eliminating any possibility of casting strains.

In addition to making deLavaud pipe in accordance with U. S. government specifications, we are also furnishing this product in the various thicknesses and weights shown in the specifications of the American Water Works Association and the American Gas Association. Write for complete information.

United States Pipe and Foundry Co., Burlington, N.J.

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association



THE NATURAL GAS CONVENTION EXHIBIT WILL BE HELD THIS YEAR IN THE ADVERTISING COLUMNS OF **WESTERN GAS**

Announcement has been made by the American Gas Association that a manufacturers exhibit will *not* be held this year in conjunction with the Annual Natural Gas Convention which convenes in New Orleans May 5th, 1930.

Western Gas this year is bringing the Convention Exhibit to the gas men.

The following list includes concerns who have made reservations for space in this big Convention Exhibit Edition.

AMERICAN METER CO.
AMERICAN RADIATOR COMPANY
THE BARTLETT-HAYWARD CO.
C. B. BABCOCK COMPANY
ARKANSAS NATURAL GAS CORPN.
BESSE, OSBORN & ODELL, INC.
THE BRISTOL COMPANY
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J. A. CAMPBELL CO.
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GENERAL PAINT CORPORATION
JAMES GRAHAM MFG. CO.
GLADDING, McBEAN & CO.
GRAND RAPIDS LOOSE LEAF BINDER CO.
GROBLE GAS REGULATOR CO.
GUARDIAN GAS APPLIANCE CO.
THE HAMMER-BRAY CO.
HILL-HUBBELL & CO.
HOUSTON PIPE LINE CO.
INERTOL CO.
INGERSOLL-RAND CO.
JOHNSON GAS APPLIANCE CO.
E. A. KEY CO., INC.
P. M. LATTNER MFG. CO.
LEAHY MFG. COMPANY
MAXON-PREMIX BURNER CO.
McEVERLAST, INC.
MEARS-KANE-OFELDT
MERCO-NORDSTROM VALVE CO.
LEE B. METTLER CO.
MONARCH PRODUCTS CO.
MOORE BROTHERS COMPANY
NATIONAL METER COMPANY
NATIONAL TUBE CO.
NATURAL GAS EQUIPMENT CO.
NAYLOR PIPE CO.
NEW ORLEANS PUBLIC SERVICE, INC.
OKLAHOMA CONTRACTING CO.
PACIFIC GAS & ELECTRIC CO.
PACIFIC GAS RADIATOR COMPANY
PACIFIC STATES CAST IRON PIPE CO.
PAYNE FURNACE & SUPPLY CO.
PHILLIPS HEAT, VENT & MFG. CO.
PITTSBURGH EQUITABLE METER COMPANY
PITTSBURGH VALVE FOUNDRY & CONST. CO.
PITTSBURG WATER HEATER CO.
PLANT RUBBER & ASBESTOS WORKS
THE REFINERY SUPPLY CO.
RELIANCE MFG. CO.
REYNOLDS GAS REGULATOR CO.
ROBERTS-GORDON APPLIANCE CORP.
ROBERTSHAW THERMOSTAT CO.
ROBINSON ORIFICE FITTING COMPANY
GEO. D. ROPER CORP'N.
ROTARY MANUFACTURING CO.
RUUD MANUFACTURING CO.
SAFETY GAS MAIN STOPPER CO.
SECURITY STOVE & MFG. CO.
A. O. SMITH CORPORATION
SOUTH CHESTER TUBE COMPANY
SPENCER THERMOSTAT CO.
SOUTHERN NATURAL GAS CORP'N.
SPRAGUE METER CO.
STANDARD GAS EQUIPMENT CORP'N.
THE SURFACE COMBUSTION CO.
L. R. TEEPLE CO.
TIME-O-STAT CONTROLS CO.
TROOP WATER HEATER CO.
UNITED GAS COMPANY
UNITED STATES PIPE & FOUNDRY CO.
VICTAULIC COMPANY OF AMERICA
WALMAR LABORATORY
THE WALWORTH COMPANY
WEBSTER ENGINEERING CO.
WELSBACH COMPANY
WESTCOTT & GREIS
WESTCOTT VALVE CO.
WESTERN GAS CONSTRUCTION CO.
WORTHINGTON PUMP & MACH'Y CORP'N.
H. G. W. YOUNG
JOHN ZINK CO.

Wire collect the number of pages you will require—regular rates apply. Final forms close April 15th.

WESTERN GAS

124 West Fourth Street **Los Angeles, California**

YOU CAN'T SUGAR-COAT LOST PROFITS

FOR many years the insatiable call for oil — and more oil — kept operators on the jump, day and night, to supply the demand. Line pipe was dumped into the ground unprotected. Any measures were justified that would speed up laying the lines and pipe the liquid gold to the sales terminals and cash in. But no more. Competition, as well as good business practice, demands protection of the pipe lines themselves in order to protect the investors. Profits decimated by huge costs of digging up, reconditioning and relaying pipe lines, are gone forever and no amount of sugar will sweeten disappointed stockholders.

For twenty-three years this organization has been developing a group of protective coatings that would meet the rigid requirements of owners and operators of pipe lines. Biturine Coatings have established a dead-line for corrosion and its destructive allies. Pipe coated with Biturine is proof against corrosion, acids, alkalis. Biturine protected pipe is being laid in ever-increasing mileage every year and is enthusiastically endorsed by operators and their engineering experts. Biturine has met the stiffest tests in competition and proved its superiority beyond question. Thousands and thousands of miles of Biturine Coated pipes are giving their owners worry-proof service and turning reconditioning "write-offs" into dividends.

Records of Biturine Coated lines will be furnished to those interested. Write to any of the offices listed opposite.

PROTECT YOUR PIPE LINE INVESTMENT *AT THE TIME YOU ORDER YOUR PIPE.* YOU CAN DO IT NOW BY SPECIFYING THE HILL, HUBBELL & COMPANY PROCESS OF MACHINE COATING AND WRAPPING NOW AVAILABLE FOR THE PRODUCTION OF SIX LEADING PIPE MILLS. WRITE FOR FULL INFORMATION.

BITURINE COATINGS

Biturine Enamel
*Biturine Enamel Primer
Biturine Coupling Solution
Biturine Solution No. 5
Biturine 70-30

*Biturine Enamel Primer can be obtained with Inhiburine.

INHIBURINE

This new inhibitor with extraordinary anti-corrosive powers is now being incorporated into Biturine Primer whenever specified. Being solvent in bitumens it becomes an integral part of the priming and functions as a second line of defense against corrosion should the Biturine Coating be penetrated.

GENERAL PAINT CORPORATION

HILL, HUBBELL & COMPANY DIVISION

PAINTS — VARNISHES — LACQUERS

Specialists in the science of protective coatings for industry

Chicago New York Tulsa Houston Dallas San Francisco
Oakland Los Angeles Portland Seattle Spokane

Export Offices: 11 Broadway, New York, N. Y., U. S. A.
160 Fremont Street, San Francisco, Calif., U. S. A.

Making Accuracy ACCURATE

ACCURATE workmanship can be accomplished only with accurate measuring instruments. But even the best instruments, when in daily use, lose their precision.

Therefore, all micrometers used in the manufacture of Worthington equipment are turned in at least once each week, and are carefully checked against master gauges of extreme accuracy before they are again released for use.

Instruments and gauges, other than micrometers, used by Worthington machinists are returned to the tool crib each day but are not put back on the racks for redistribution until their accuracy is checked . . . and all new taps and dies are carefully checked for accuracy before they are admitted to Worthington's tool stock.

This is the secret of the close tolerances to which the Worthington shops work . . . the secret of proper fit, of positive interchangeability, of quiet operation, of high operating efficiency, of long life.

Accuracy as defined for ordinary machine shop practice is not good enough here . . . for Worthington products, accuracy must be precisely accurate.

WORTHINGTON

PUMPS
COMPRESSORS
CONDENSERS *and* Auxiliaries
DIESEL ENGINES
GAS ENGINES
FEEDWATER HEATERS
WATER, OIL *and* GASOLINE METERS

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Branch Offices or Representatives in Principal Cities of all Foreign Countries

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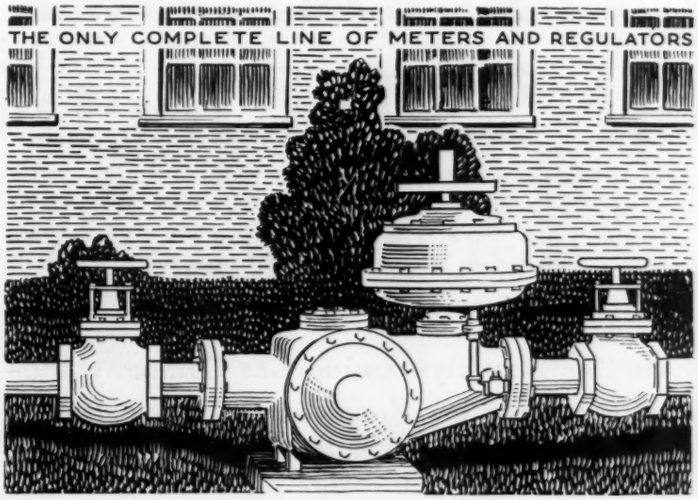
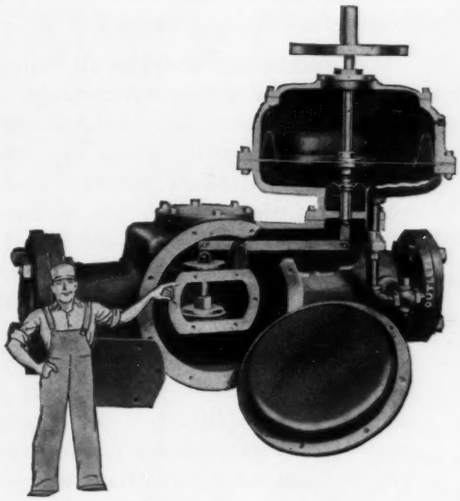
WORTHINGTON



FOR LOW PRESSURE REGULATION -EMCOS



"Supersensitive"—the tribute payed by gas engineers to the EMCO low pressure regulator. Long sensitive diaphragm stroke, relatively short valve stroke, permits large diaphragm area responsible for high degree of accuracy. Diaphragm type seal used in diaphragm stem—eliminates friction, pumping and chattering.

Of course the Removable valve box; One piece body casting; Interchangeability of parts; are found in EMCO low pressure regulators.

EMCO PRINCIPLES

Removable Valve Box · One Piece Body Casting
Interchangeable Diaphragm Heads
Long Sensitive Diaphragm Stroke
Relatively Short Valve Stroke

EMCO METERS AND REGULATORS

PITTSBURGH EQUITABLE METER COMPANY

Main Office and Works—Pittsburgh, Pa.

New York City · Chicago, Ill. · Los Angeles, Calif. · Tulsa, Okla. · Dallas, Texas · Columbia, S. C. · Salt Lake City · Kansas City, Mo. · Seattle, Wash. · Houston, Texas

PLUMBERS sell 224 Electrolux units for one gas company

In 9 months Brooklyn Union Gas Company adds 336 MCF to monthly domestic load by sales co-operation of master plumbers

A tiny gas flame takes the place of all moving parts

BY ORGANIZING master plumbers to merchandise and sell Electrolux, the Brooklyn Union Gas Company has developed an especially effective means of permanently increasing the domestic load.

Since last June, when the plan first went into operation, master plumbers of Brooklyn and Queens have cooperated to sell 224 Electrolux refrigerators. The average increase in billing from Electrolux is 1500 feet per month. This means that plumber cooperation has increased the monthly domestic load of the Brooklyn Union Gas Company by approximately 336,000 feet. And, in addition, has paid both the plumbers and the company generously in profits.

Gas companies anxious for bigger profits find plumber cooperation in the sale of Electrolux particularly successful. Because gas refrigeration transforms small domestic accounts into permanent large accounts, builds up the off-hour load, creates new prestige for the gas industry.

Your community provides an unlimited market for automatic refrigerators. Are you going to utilize the added cooperation of master plumbers in turning this fruitful market into increased gas load and increased gas company profits? Millions of women are reading each month about the matchless economy, silence and dependability of Electrolux in national magazines like the Saturday Evening Post, Good Housekeeping, House & Garden. And we have a wide variety of sales and merchandising helps that you can supply to master plumbers to assist in making contact with builders, owners and housewives. Ask us about them today. Write, wire or telephone Electrolux Refrigerator Sales, Inc., Evansville, Indiana.

PLUMBERS INCREASE GAS LOAD *when they display and sell Electrolux in their stores. At left, the attractive shop of Jacob Stockinger, Jr., master plumber, of Long Island City, one of the 96 plumber-dealers of the Brooklyn Union Gas Company.*

ELECTROLUX

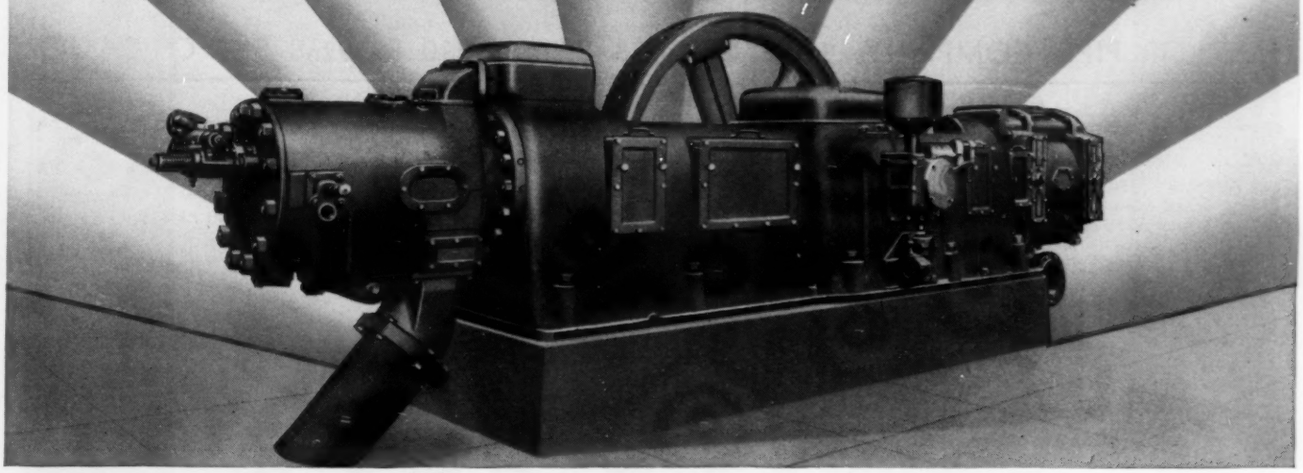
THE *Gas* REFRIGERATOR

COOPER-BESSEMER

TYPE 10

WHETHER you are a manager, operator, stockholder or superintendent — you are interested in seeing your plant operate at a profit — and that's exactly why these thoroughly engineered units win favor. Their low operating costs often mean the difference between a profit and a loss. Improvements in cooling, lubrication, cylinder head and piston make the new Type-10 a wise choice for any compressor work within its power range.

THE COOPER-BESSEMER CORPORATION
Formerly the C. & G. Cooper Company and The Bessemer Gas Engine Company
Mt. Vernon, Ohio Grove City, Pennsylvania
Branch offices in all principal oil and gas fields



2-CYCLE SIMPLICITY.
LOW OPERATING COSTS.
LOW MAINTENANCE COSTS.

FUEL ECONOMY.
FEWER SHUTDOWNS.
LOW INVESTMENT COST.

One and one-half ton truck hauling nine uniform 40 foot lengths of 16" Naylor Pipe

Saving $392.83

Per Mile in Trucking, Unloading and Stringing ...Because of one Naylor Pipe advantage

TRUCKING, unloading and stringing a 12" Naylor Pipe line cost one oil company only $114.05 per mile.

Compared with their cost figures on another 12" line of standard weight pipe, random 18 to 22 foot lengths, laid under similar conditions---the saving was $392.83 per mile.

Naylor Pipe is the lightest weight pressure pipe. It weighs only half as much as standard weight wrought pipe.

Because of this light weight, trucks hauling Naylor Pipe can carry double the load...fewer trips are needed. Unloading is simplified---as well as stringing, because the light weight makes handling easier, faster and requires only half as many men on the job.

But trucking, unloading and stringing wasn't the only economy on this 12" Naylor Line. The complete comparison of the cost figures on the two lines---including all costs from freight to "as laid in the ground"---showed a net saving of $2,064.74 per mile on Naylor Pipe.

For the greatest economy, lay all your lines with Naylor Pipe.

NAYLOR PIPE COMPANY, Main Office & Plant, 1230 E. 92nd St., CHICAGO

SALES OFFICES

25 Church St., New York
Witherspoon Bldg., Philadelphia
1209 First National Bank Bldg., Pittsburgh.
507 Philtower Bldg., Tulsa
601 Post-Dispatch Bldg., Houston

DUCOMMUN CORPORATION
LOS ANGELES SAN FRANCISCO
Exclusive Distributors:
California, Arizona, Nevada and Utah

MONTREAL, CANADA
Mechanical Equipment Co.,
New Birks Building

TONCAN COPPER

Naylor Pipe

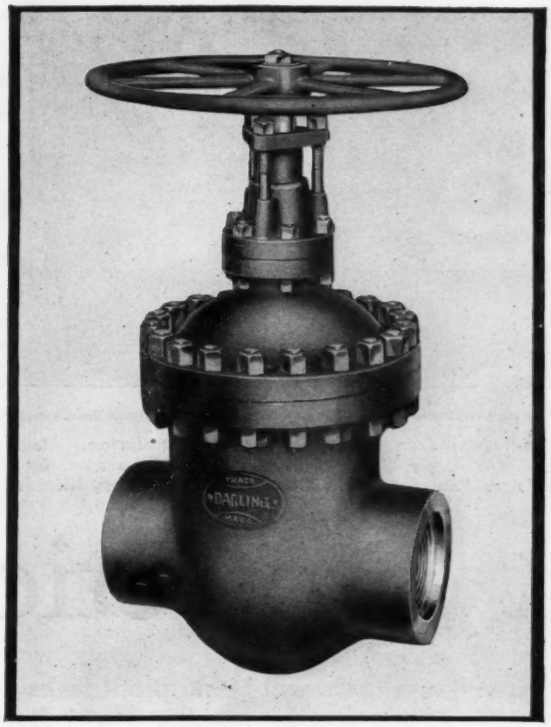
Maximum Structural Strength Mo-lyb-den-um With Minimum Weight

IRON

Standardized Naylor Pipe is made in sizes 6" to 12" I. D. and 14" to 20" O. D. in any uniform length desired up to 40' 0". Ends made to wrought pipe standards for all types of coupling.

Where corrosion is not a problem, Naylor Pipe can be furnished in steel.

Toncan Copper Molybdenum Iron is a development of Central Alloy Steel Corporation, the world's largest and most highly specialized alloy steel producers. It possesses a superior corrosion resistance, making it the favored pipe material.



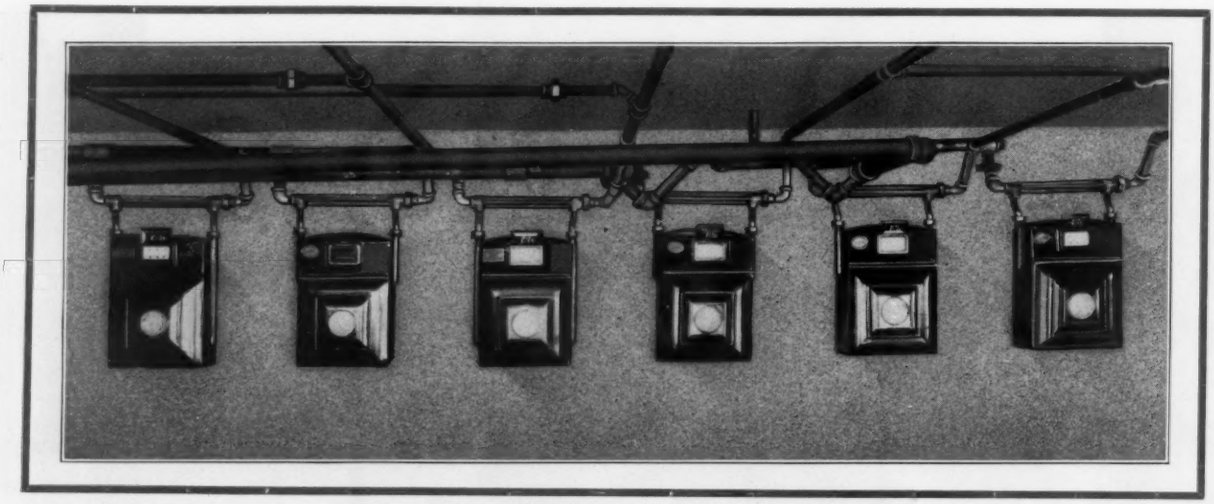
For Peace of Mind

THE uncertainties attending gas production will probably never be eliminated, BUT why increase your risk by using valves of unknown strength?

High pressure wells and other hazardous conditions become less of a gamble when Darling Forged Steel Valves are employed. When you stop to think that these valves are made for working pressures of 1500 and 3000 pounds, you quit worrying whether they will hold out.

Darling Valve & Manufacturing Co.
Williamsport, Pa.
New York Chicago Oklahoma City Houston

DARLING
GATE VALVES



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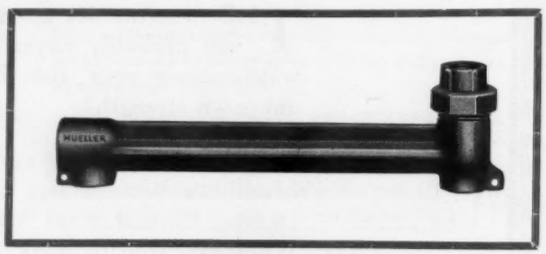

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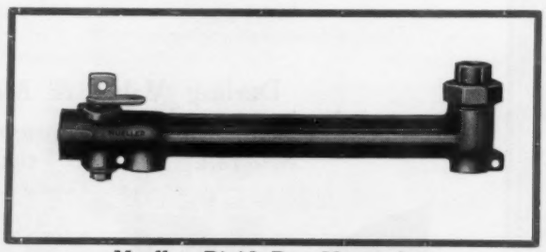

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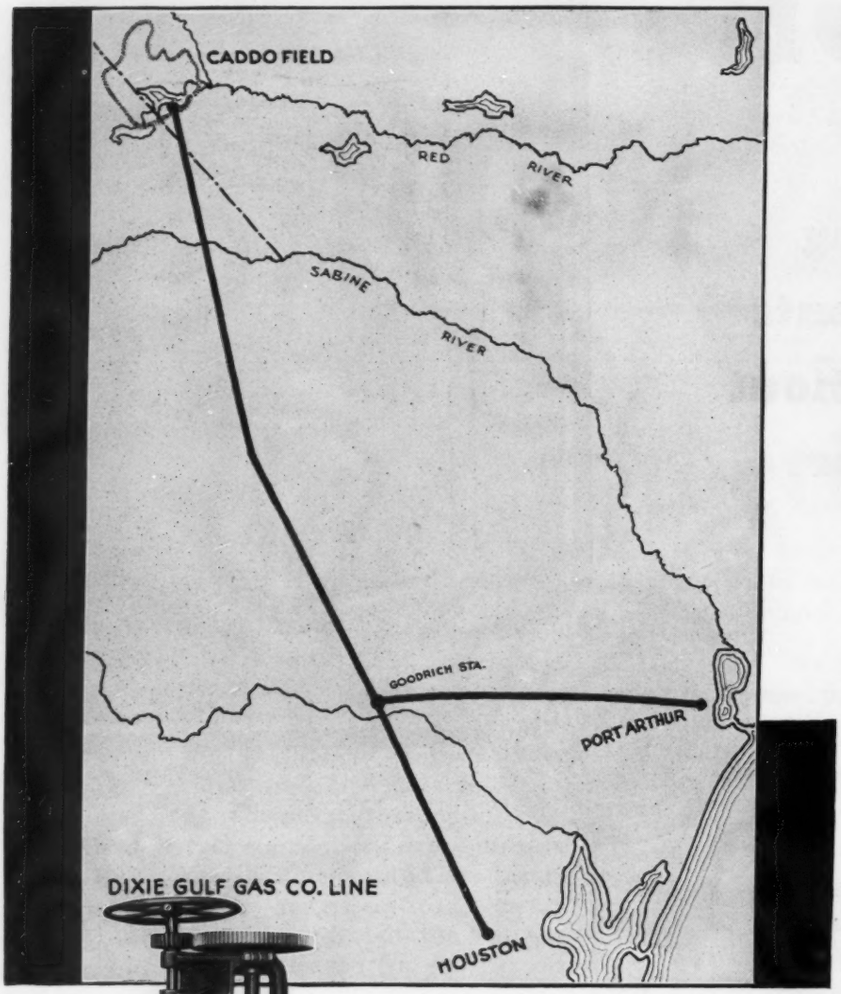

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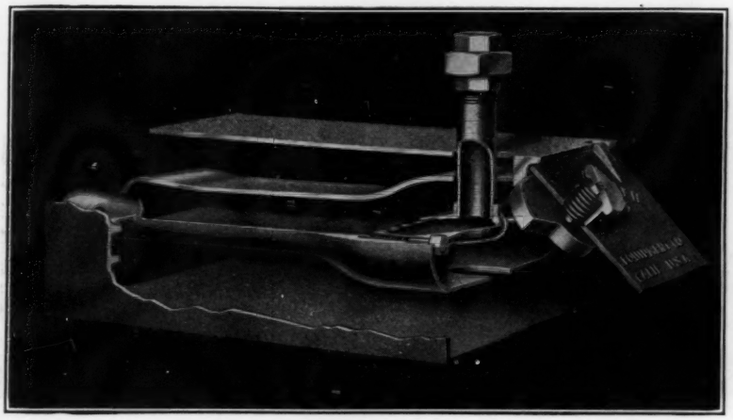

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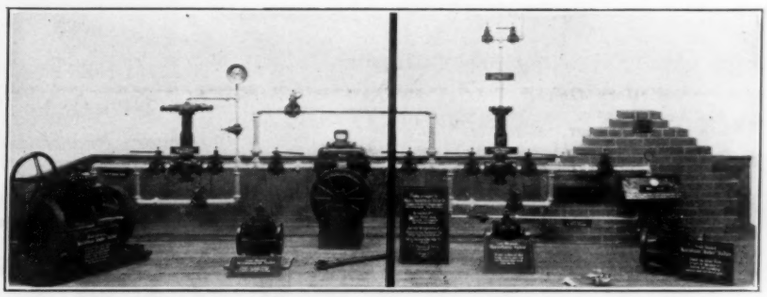

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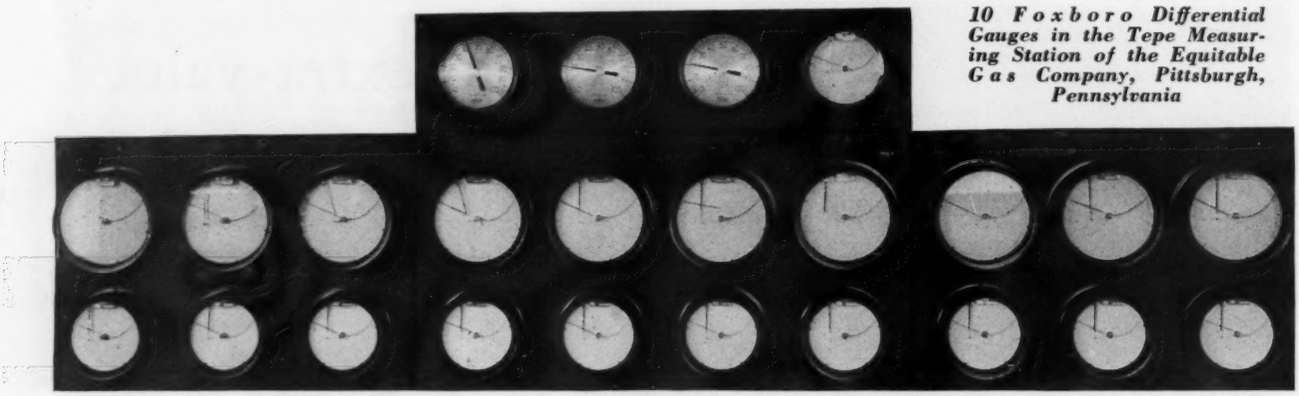

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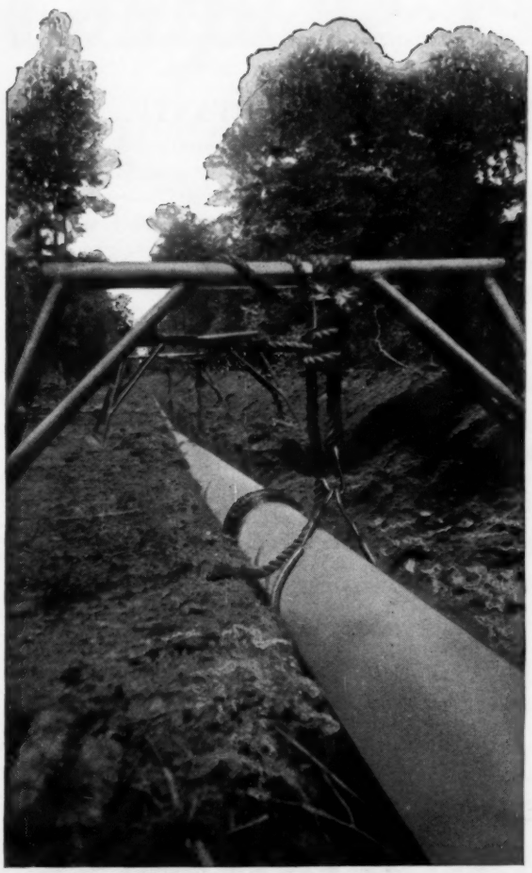

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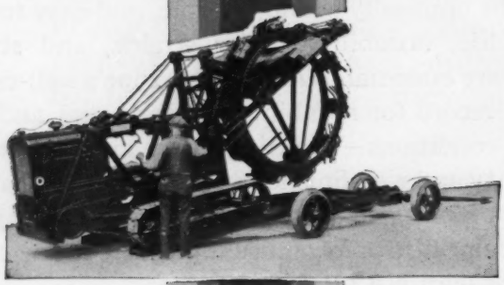

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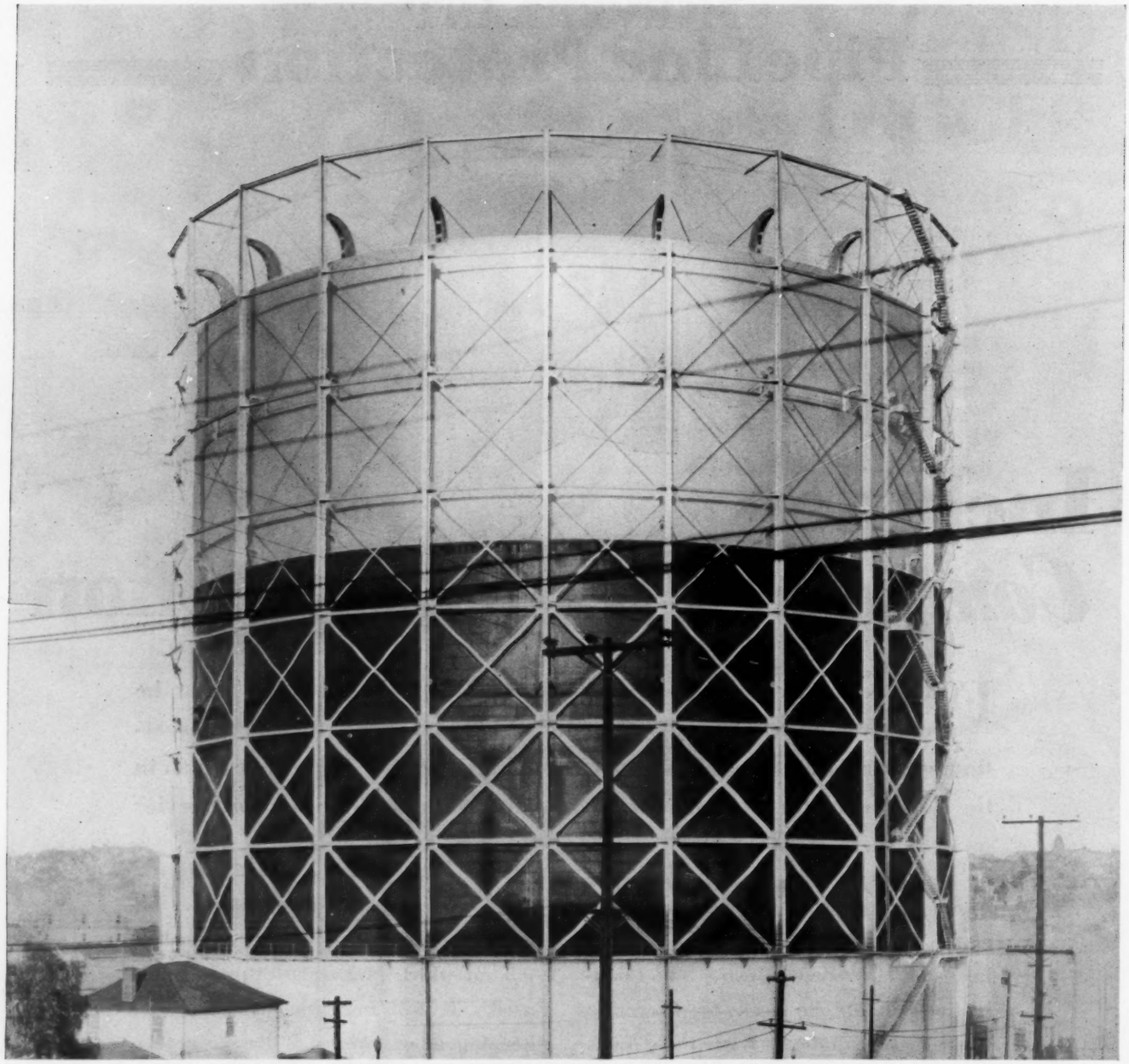

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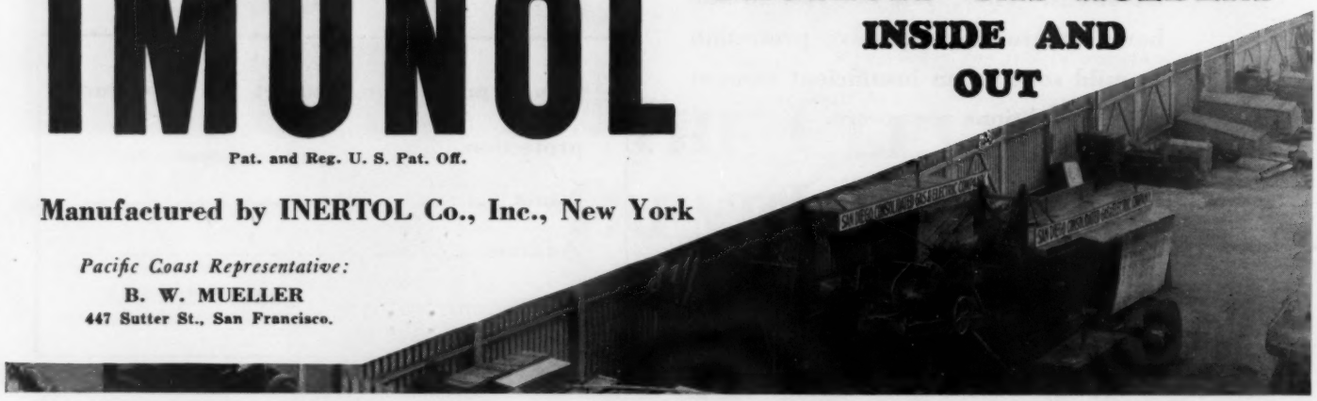

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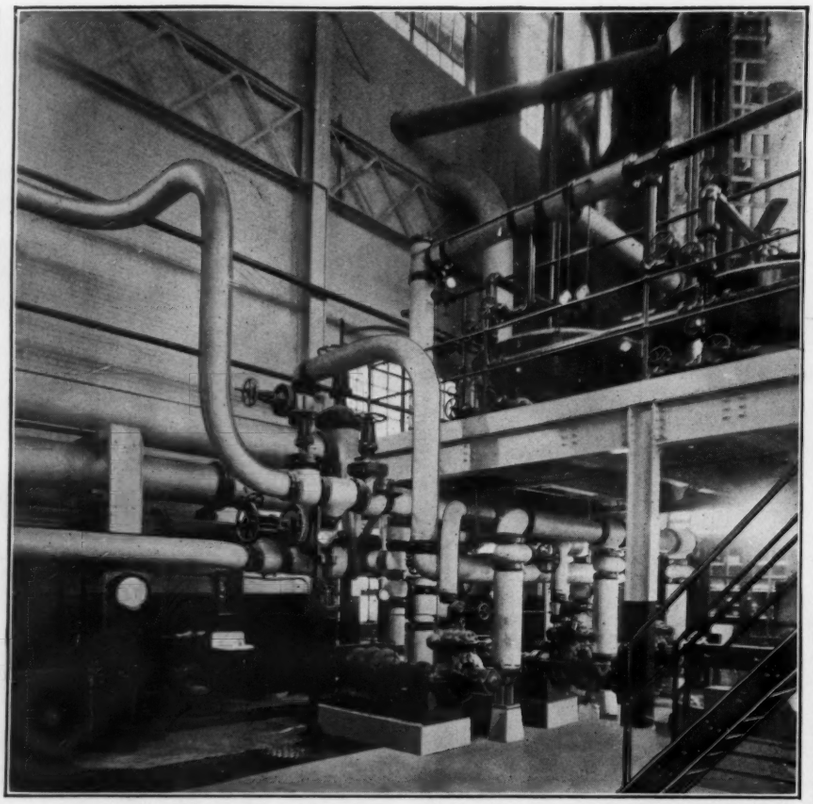

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Mid-West Gas Association Rounds Out Its Quarter Century

By GEORGE H. FINLEY
Managing Editor, Western Gas

ONE of the oldest and most serviceable of regional gas organizations is about to draw its members together in celebration of its 25th anniversary. During the three-day period, April 14-15-16, the constituency of the Mid-West Gas Association will hold convention at Waterloo, Iowa, with headquarters at the Russell-Lamson Hotel.

Waterloo is a particularly appropriate site for this quarter-century convention, because it brings the organization back to the state in which it had its beginnings. Formed in 1905 as the Iowa District Gas Association, covering the state of Iowa only, the Association gradually extended its scope to include adjacent states as the need for its services became apparent. Nebraska and North and South Dakota were first added, and the name changed to the Mid-West Gas Association. Then, five years ago, Minnesota entered and extended Association territory to comprise the gas industry of five states.

Waterloo also is the home of H. B. Maynard, of the Iowa Public Service Company and a charter member of the Mid-West group. He is rounding out a quarter century in its service, and the convention is placed at Waterloo as a tribute to him.

An effort is being made to call back to the convention all of the older members of the Mid-West Gas Association, who took part in its early development. Their attendance is desired whether or not they are still affiliated with the industry, for this convention, more than usual, is designated as a home coming to the entire membership. A program of merit has been scheduled. There will be five general sessions, beginning the morning of Monday, April 14, the annual banquet being arranged for the evening of the 15th. A meeting of the new administration, to be elected at the first session, will be held the afternoon of April 16, and will officially close the convention.

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2nd Vice-President

Details of the program will be found in chronological form, at a later place in this report. It will be noted that they are primarily commercial in character, which is partly due to the fact that technical problems of the Mid-West territory come up for discussion each year at the Gas Meter Short Course—one of the Mid-West Gas Association's most important activities. For nine years the Association has conducted the Gas Meter Short Course in conjunction with the Engineering Extension Service of the Iowa State College, its sessions being held on the campus of the college at Ames, Iowa. Distribution and production topics are now featured on the program of the Short Course, supplementing the meter shop practice and practical demonstration work designed for those concerned in gas measurement. R. L. Klar, engineer of the Des Moines Gas Company, Des Moines, Iowa, and chairman of the Short Course Committee, comments upon high points in the 1929 Course in a later section. Dates for the Short Course were December 3-6, inclusive.

Following is the program which, with one or two possible modifications, will greet those who attend the 25th Anni-

(Continued on Page 51)

Classification *of* Sales

for intelligent rate-making, merchandising direction and budget preparation

By T. V. PURCELL

*Vice-President in Charges of Sales, The Peoples Gas Light and Coke Company, Chicago, Illinois**

IN the early days of the gas industry, when our business was exclusively lighting, our customers were all of one class, the so-called "domestic class." Their needs were almost identical and their habits with respect to the use of gas were similar. The use of gas was affected by the same conditions of long or short days, cloudy or sunny skies, and this resulted in practically an identical load factor for every customer. Nor was there a very wide range in the volume used.

Under these conditions, the flat rate generally charged was satisfactory and was a fair way of assessing on individual customers the total costs of operating the business.

Later on, with the advent of cooking and the loss of lighting, this situation was not materially changed. The cooking customers were the same as those we had supplied for lighting, and they all had about the same habits with respect to the use of gas for cooking.

So here again we had a large group of customers whose individual load characteristics and demand were practically the same.

Of course it would have been very interesting if we had been able to separate lighting from cooking. We would then have been able to note the trend downward in lighting and the trend upward in cooking. We were able to get along without this because the cooking came on faster than we lost the lighting business, the net result being a steady increase in total sales year after year. Had the situation been reversed and we had lost the lighting load faster than we secured the cooking load, it would have been most helpful if the curves of each class could have been plotted so that we would be informed promptly of the trend, to enable us to take the necessary steps to safeguard our investment.

If we trace the history of our industry a little further, we come to the time when the lighting load was practically negligible, and our business had become almost 100 per cent cooking. With important changes in the habits of the people, this cooking load was more or less threatened, and we were forced to find other avenues of sales.

We began to take on hotel and restaurant, water heating, industrial, and house heating business. These new classes were taken on so gradually that in the beginning it was hardly thought necessary to attempt to make any classification, but as these classes grew in volume and in proportion to the whole, it became very evident that we must have some way of segregating them, both as to volume and as to costs.

Even a superficial investigation shows that these classes are very different in those characteristics affecting the cost of service. It is apparent, therefore, that there is a need for statistics to show all the significant features of the various classes of business. This is the primary purpose of a current classification of sales, the justification of which may be summarized under three heads.

1. It is an essential in the analysis of the cost of service preliminary to the construction of equitable and competitive rates.
2. It is necessary for the intelligent direction of sales effort.
3. It is required as a base for the preparation of a budget.

Let us now analyze the first objective, which is *acquiring data for rate-making.*

It goes almost without saying that the cost of service differs with varying load characteristics. Load characteristics are those factors inherent in a specific use of gas that determine the cost of supplying the gas. Among these factors are volume, maximum hourly demand, maximum daily demand, time of demands, etc. It is obvious that volume is an important element of cost, but there are other elements that are independent of the volume delivered. These cost elements are commonly grouped by the rate-maker under four main headings.

First—Production Demand Costs

These costs are determined by the volume of gas that will be required by all customers on the system's maximum day. Since hourly fluctuations in demand are cared for by the use of storage holders, the daily maximum demand of the system determines the production investment required.

Second—Distribution Demand Costs

The size of the gas company's distribution system is dependent largely upon the hourly maximum demand.

It may be here noted that volume delivered has no bearing on the above costs, since the charges accruing thereto exist even though no gas may be used by an individual customer.

Third—Commodity Costs

This division of expense includes only the cost of the raw materials going into the product and the necessary production labor, etc. These costs are dependent upon and vary directly with the volume of gas produced.

Fourth—Customer Costs

These include all expenses incurred in reading meters, billings, collecting, etc., and are practically the same for each customer, and are independent of the volume of gas used.

It is apparent then that the costs imposed on the gas company by any individual customer are dependent upon the demand he makes on the facilities of the company, the time of the day or year that he makes this demand, and the volume of gas he uses; that is to say, costs depend upon load characteristics.

Of course it would not be practicable to consider the load characteristics of each customer and construct a rate for him individually. However, it is not only practical but necessary to consider the characteristics of groups or classes of customers if we are to construct rates that will be fair as between groups and that wil be competitive with other fuels.

*To be presented before the American Gas Association Accounting Section Conference, meeting in Chicago, Ill., April 3-4, 1930.

The more important groups of customers are the Domestic, Hotel and Restaurant, Commercial, Industrial, and House Heating.

It would take too long and would be somewhat outside the scope of this paper to discuss the peculiar features of the use of gas by each of these groups and to trace their effect on the cost of service; but it might be well to consider for a moment two curves, Fig. 1, representing the annual daily load factor of the domestic load, and Fig. 2, that of the house heating load.

The whole of each rectangle may be taken to represent the capital required for the necessary production equipment to supply the maximum day of 100. The shaded portion below the line represents the annual daily load factor, or the amount of capital usefully employed. The unshaded portion above the curve shows the idle investment in production equipment.

A comparison of these two curves brings out the fact that for the domestic load the production capacity is in useful operation 74 per cent of the time, whereas for house heating it is in useful operation only 28 per cent of the time. This difference must be reflected in the price of gas for each of the groups. House heating must carry a penalty in a demand charge two and a half times greater than that included in the price of domestic gas.

This penalty would make it impossible to sell gas for house heating if it were not for other characteristics that affect the costs in the other direction and make it possible to sell gas for house heating at a lower price than for domestic use.

It follows, then, that it is absolutely essential that the rate-maker be provided with a classification of sales, so that he may evaluate the characteristics of each class of business in order to construct equitable and competitive rates.

Coming now to the second reason for classification of sales—that of *effective sales direction*. Sales executives today recognize the necessity of market analysis, but when a sales manager of a gas company undertakes to make such an analysis, he finds he has several distinct markets for his service instead of one. He finds that his customers, present and prospective, group themselves into definite classes, differing widely in the type of service demanded. This suggests at once that we will require as many methods of approach in our advertising and in our salesmanship as we have separate classes.

In the domestic class, we are dealing with a cross-section of the whole community, but the individuals who are most concerned with the service are women, that is to say, the housekeepers. Our advertising appeal and the general sales plan must be adapted to this particular public. In fact, even in the selection of the salesmen, we must have well in mind the class of people we are dealing with. The salesmen must indulge in much doorbell ringing, or cold canvassing. They beat up the bush, closing sales where their experience and ability permit, and opening the way for men with better technical training where that is necessary. These men are recruited from many walks of life and

(Continued on Page 52)

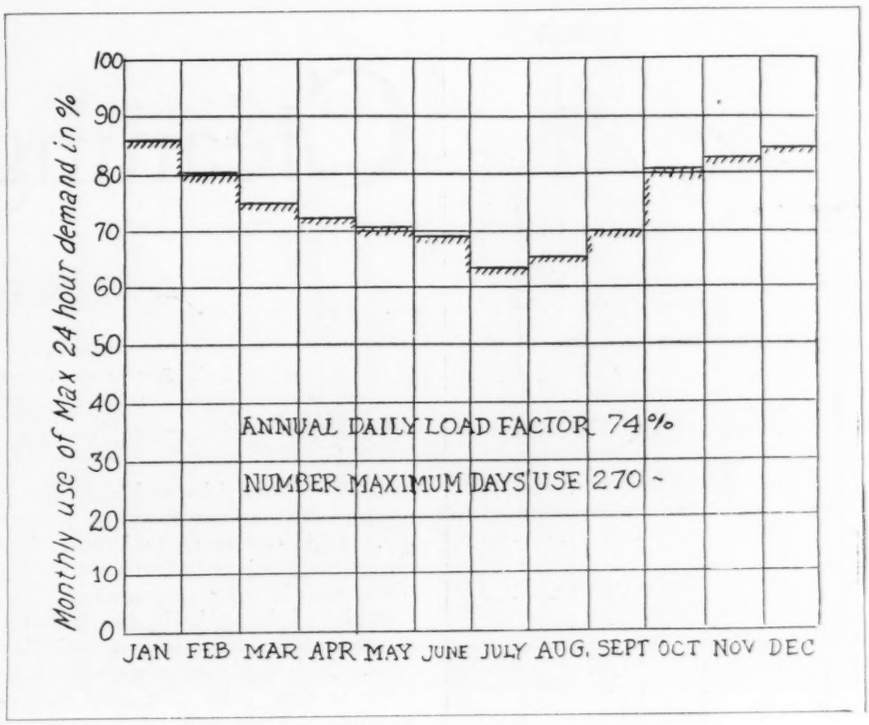


Fig. 1. Domestic

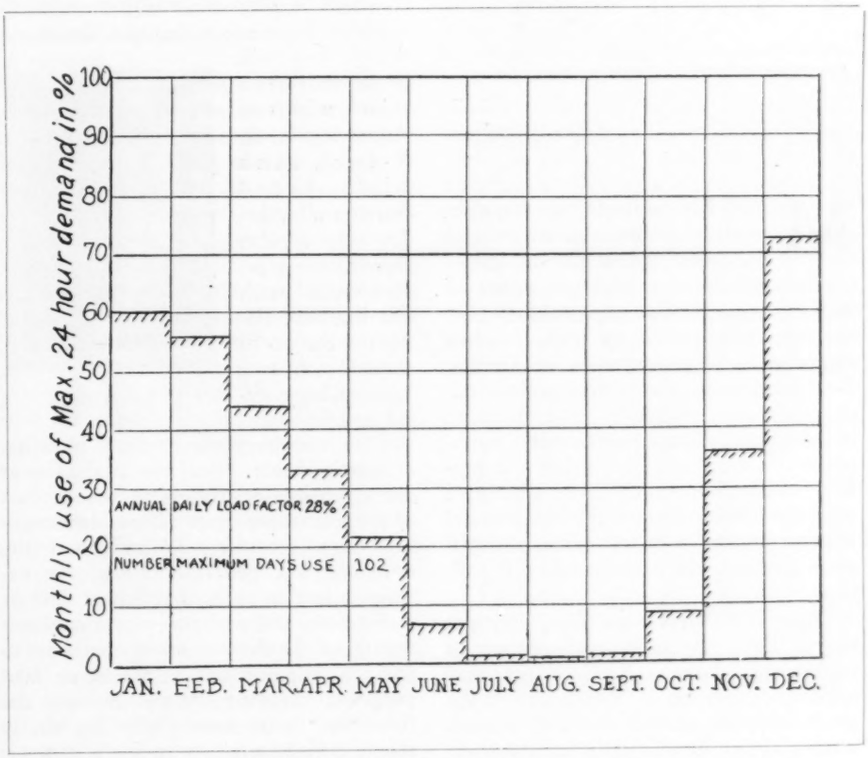
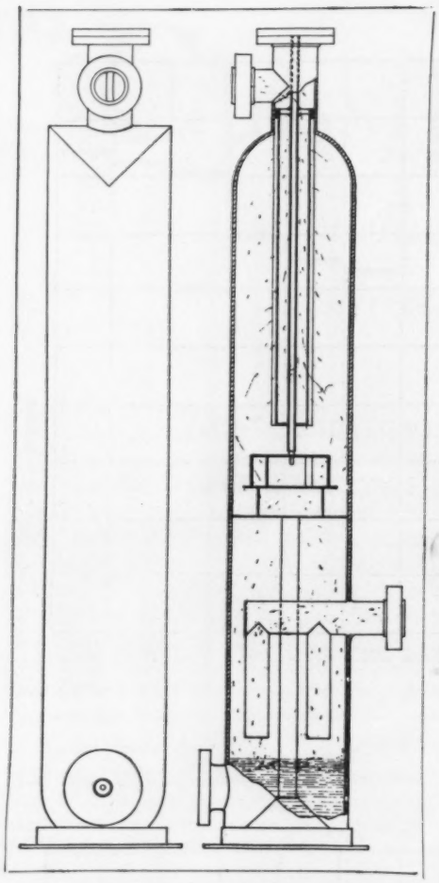


Fig. 2. House heating



Cross section view of dust separator used by Cities Service Gas Company

Cleaning Natural

By N. D. HOLMAN

Superintendent of Gas Sales
*Cities Service Gas Company, Bartlesville, Oklahoma**

MODERN methods have brought modern problems to the natural gas man. Since the oil industry has introduced residue gas as one of the large sources of supply, much trouble has been experienced by both mainline and distributing companies in keeping dust formed by a corrosive action, out of compressor cylinders and domestic burning appliances, consequently, methods of cleaning and delivering the product to the burner tip have kept pace with the development of the latest model kitchen range or other efficient appliance through which the product is utilized.

Sources of supply are from dry gas wells, shale gas wells, and residue or casinghead plants. Each source may impose a condition in the nature of the gas to require special cleaning or processing either to eliminate serious operating problems or to insure a perfect fuel at the burner tip. Sand gas, or dry gas as it is usually spoken of, comes from wells ordinarily free from water or vapor troubles and is more easily handled than gas from other sources. Syphon tubing is placed in some wells for the purpose of lifting liquid off the sand to allow free flowing of the gas. Drips on field gathering lines will catch sand or rock particles and such liquids as naturally condense from the flow of gas. It is customary to have a drip close to the well, and often the purchase meter will be on a drip header. The condition of the sand will determine the number of the drips on field gathering lines. It is not uncommon to find as many as three drips on a short gathering line. They will catch water or gasoline and are blown by the field man in charge as often as conditions demand.

Field drips are of simple design; a 4-inch line will be expanded to a 6-inch with two 4-inch legs to an 8-inch tank which, placed horizontally, below the regular flow of the pipeline, will catch the liquids. Allowing the gas to expand acts as a condensing method and no attention is necessary other than blowing. Drips in main lines are advisable at certain points regardless of the dryness of the gas transported. These drips vary in design according to whims of the designer, but generally allow for expansion, a change in direction of flow or circulation, and sometimes have impingements on baffles or other methods to effect a dripping out of fluids, or dust particles. Having the gas dry and the line free from water will practically assure a clean product to the consumer, and few operating troubles will be experienced. Dry gas wells may give practically no trouble from liquids in their early life, but as rock pressures are lowered by continued depletion, water will start to penetrate the sand and in time it will be necessary to give constant attention to drying the gas.

N. D. Holman

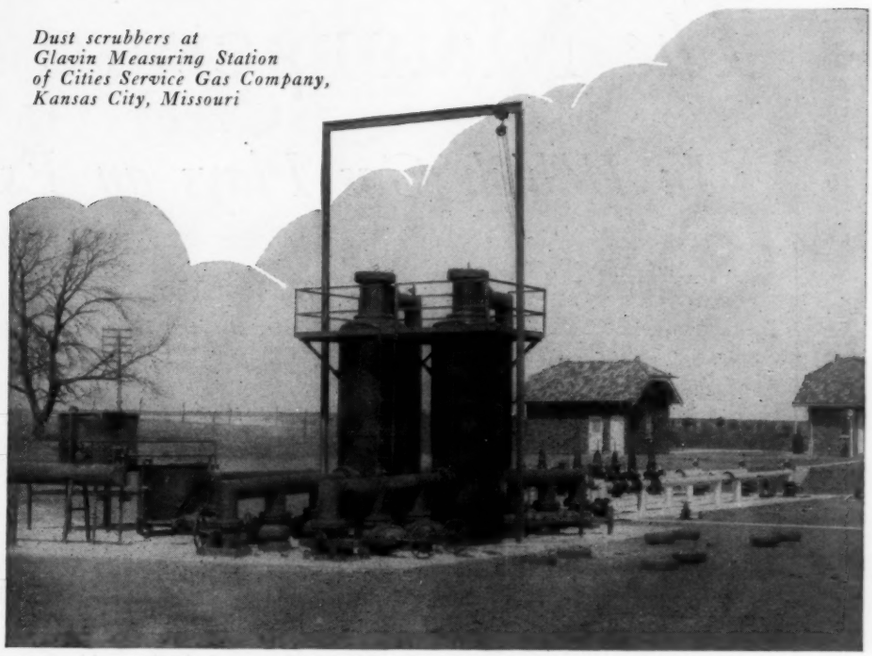
Shale gas, invariably, is produced with water which seems to be an integral part of the shale formation. Elimination of the water is done above the ground at the well connections through automatic drips that continue to function without much attention as long as weather permits. These drips usually return the water to the bottom of the hole as fast as it is collected. The chief operating problem is in keeping the connections from freezing during frigid weather. Pipeline drips are necessary on all lines carrying this type of gas and once the water is eliminated, the consumer receives a satisfactory quality of gas.

About 15 years ago, oil producers began to utilize gas coming from oil sands containing gasoline vapors for the purpose of extracting the gasoline content. The left-over gas was not considered valuable and was allowed to blow off to the air. Gas pipeline companies advocated its conservation and in the Mid-Continent field the first connections were to gasoline plants in the Burbank district, Osage County, Oklahoma. Royalties to the Indians were on the basis of dry gas from their lands and with the necessity of pumping, building pipelines and establishing markets capable of consuming the gas as it was available, high initial costs were immediately assumed.

Residue gas leaving gasoline plants would contain small amounts of carbon dioxide, light gasolines, oxygen and water vapors, which would condense after leaving the compressors. Water by itself will not cause extensive corrosion; neither will oxygen by itself. A combination of the two, assisted by carbon dioxide or light gasoline vapors in the gas flow was causing internal corrosion. Thus, as a result of handling residue gas in large quantities through natural gas transmission lines, modern methods of cleaning the gas and eliminating products of corrosion developed.

*A paper read by the author before the Gas Division of the Oklahoma Utilities Association at the Association's 12th Annual Convention, March 11-13, Tulsa, Oklahoma.

Gas



Dust scrubbers at Glavin Measuring Station of Cities Service Gas Company, Kansas City, Missouri

Continued corrosion would soon develop flakes and the velocity of the gas would move the flakes through the pipe. In time, a very fine powder or dust would develop, seeking a place to stop. Many companies did not give consideration to the burden of dust troubles until they became so severe that something extraordinary was necessary to alleviate the troubles.

MEETING DUST TROUBLES

The first studies made of the situation resulted from the extreme amount of trouble experienced at compresser stations.

Dust was wearing compressor rings, liners in compressor cylinders, and ring slots in compressor pistons. Rod packing was being worn, allowing leakage, which was an item in itself, and in general, all working parts which came in contact with the gas containing the fine dust were being affected and their remaining life shortened. The shut-downs which were caused by the dust condition and the leakage of gas through worn portions were items very difficult to figure in dollars and cents. Along the transmission lines regulators were giving trouble, seats on valves would not hold, and every mechanical piece of equipment having moving parts, demanded additional attention over normal operating conditions. In distributing centers the first complaints came from consumers using automatic equipment. Pilot lights would often be extinguished, spuds on domestic appliances were becoming stopped with the dust, radiants were discolored and these many complaints were causing considerable expense to distributing companies.

SCRUBBER DEVELOPED

It was absolutely necessary to cure the cause and take care of the effect. Locations of troubles were not general and only appeared on portions of the pipeline system carrying residue gas. The first work done was to develop a method of catching the dust already formed. The Cities Service Gas Company did considerable work resulting in the development of an effective dust scrubber. The final design was very simple with a comparatively low operating cost.

A steel cylinder is used, varying in size from 24 inches to 60 inches in diameter and from 8 to 16 feet in height, depending on the quantities of gas to be handled. The cylinder is placed in a vertical position and gas is injected through a horizontal pipe which has outlets through vertical legs extending downward to a point nearly touching a body of mineral seal or other suitable type of oil. Above the horizontal inlet pipe a partition is installed in the cylinder in such a way that all gas must pass into the upper chamber through nozzles set at a tangent. From the top of the cylinder a screen is inserted in a vertical position on a rod, as a guide, extending downward to about 12 inches above the partition plate. Ordinary fly screen wire is wrapped 18 to 21 times around a perforated metal cylinder through which the gas passes on to the pipeline. A loose plate on the bottom of the screen acts as a safety device in case of the screen clogging and stopping the flow of gas. The churning action of the oil caused by the inlet gas pressure breaks up the oil into a fine mist. This mist tends to knock down the dust particles that may enter with the gas and as the fine mist or spray passes through the nozzles into the upper chamber, a swirling action throws most of the dust laden oil against the side walls. As it collects on the floor of the upper partition it is carried by down pipes to the lower chamber at a point where it is submerged by the body of oil. The balance of the oil which does not collect on the side walls of the upper chamber will collect on the screen tending to wash it down. When cleaning the scrubber, it is taken out of service and the dust-laden oil from the bottom of the chamber is blown into a sludge tank, sitting on a platform near the separator, where it is allowed to settle. From this sludge tank, the cleaned oil is allowed to flow into the lower sludge tank sitting on the ground level from which it is pumped by hand to a charging tank before re-injecting into the cylinder for further use.

PROPER BY-PASSES NEEDED

In constructing separators or scrubbers, it is necessary to arrange proper bypasses to allow for cleaning and inspection.

The first scrubber installed was located at Eldorado, Kansas. Since then, 15 installations have been made by the Cities Service Gas Company. Scrubbers are placed ahead of all principal compressor stations and at certain town borders where dust has given trouble in the distribution system. Many other pipeline companies have experienced dust troubles and have made their own experiments with mechanical means to catch dust. Scrubbers of similar type or embodying the general principles of the Empire scrubbers have been constructed by other gas companies and it is the writer's understanding that one or two

(Continued on Page 56)

The Manufacture *of* Glass

In Which Gas Plays an Essential Role

By LEE HOLTZ

General Superintendent, Manufacture and Distribution, Southern California Gas Company

IN his group of related articles upon gas application in the ceramic industry Mr. Holtz now approaches an absorbing phase—that of glass manufacture. This subject will divide itself into several chapters, another of which will appear in *Western Gas* for May. The current installment lays the groundwork for those to follow, touching briefly upon historical aspects of glass making, and dealing with the subjects of materials, melting equipment, air supply, combustion, and insulation.—*Editor.*

History

IN the earliest days of its use the similarity of glass to minerals, and the exquisite coloring which could be had in it, made it specially adapted to jewelry. Beads, quite crude in form, appear to be the oldest samples of glass which are known to exist. Probably the pioneering process of manufacturing was simply the melting of a few raw materials to form a lump of crystal-like substance, which was then ground into shape. From this simple beginning, the next step was a hollow article produced by a molding process to form a crude vase. It is a question whether these early forms were true glasses, but from the evidence now available it is certain that some form of glass or glaze was used over 3,000 years ago.

The earliest forms of glass having any utility were vases used principally for holding wines, and limited to the wealthier class. From the tombs unearthed in the ruins of ancient Egypt, many glass articles have been recovered. Many of these are vases of elaborate design, highly colored, dating back to the 28th dynasty (1684 to 1591 B. C.) During this period some sort of molding process was employed, for the art of blowing glass had not been discovered.

The Roman writer Pliny says that glass was first discovered by some Phoenician sailors, whose ship was driven ashore at the mouth of the river Belus in Syria. As the sea was very rough, they cooked their dinner on the beach and finding no stones to rest their pots on, they put under them some pieces of Nitrum (supposed to be soda) with which their vessel was laden. This, and the sand, melted by the heat of the fire, ran together and a substance like glass was found in the ashes.

This story may be only a tradition, but nevertheless it has certain facts behind it. Glass is not found in nature to any great extent, and even if some material resembling glass had been discovered, it would have offered no indication to the men of that period as to the method of formation. It is probable that an event such as described by the historian did furnish the suggestion that by the fusion of sand and soda, a substance like glass could be formed. With the advent of the blowpipe and putty, glass-making took on an entirely new aspect, but the exact date of the introduction of the art of glass blowing is indefinite. Some evidence indicates that glass was first blown about the time of Alexander (323 B. C.) and this improvement in the working of glass afforded the best real beginning of glass manufacturing.

The first industrial enterprise in the American colonies was a glass factory for the manufacture of bottles, established in the colony of Virginia about one mile from Jamestown in 1607. Glass also constituted a part of the first shipment of goods exported from America.

In 1796 the first coal-fired furnaces were operated in Pittsburgh, Pennsylvania, for the manufacture of hollow ware, bottles and window glass. In 1864 a firm in Wheeling, West Virginia, substituted a clear, brilliant soda-lime glass for the more expensive lead glass. The kerosene lamp and incandescent mantle brought accompanying developments, and then came the electric bulb, about 1870.

Natural gas was first used in Siemens furnaces in the region around Pittsburgh about 1872. In 1881 plate glass began a profitable career, and in 1882 pressed blanks, including the finished neck of a bottle, were accomplished. This led to other developments, among which the Owen's bottle machine of 1903 is an outstanding example. Wire glass came into its own about 1892, and about this time the use of a bait and compressed air for drawing window glass cylinders was found to be successful and an improvement over previous methods.

One could go on at length describing progress in the glass industry up to the present time, but as time and space will not permit so doing at this writing, this article will describe present day methods touching particularly upon the business in Southern California, where natural gas is being used extensively in glass making.

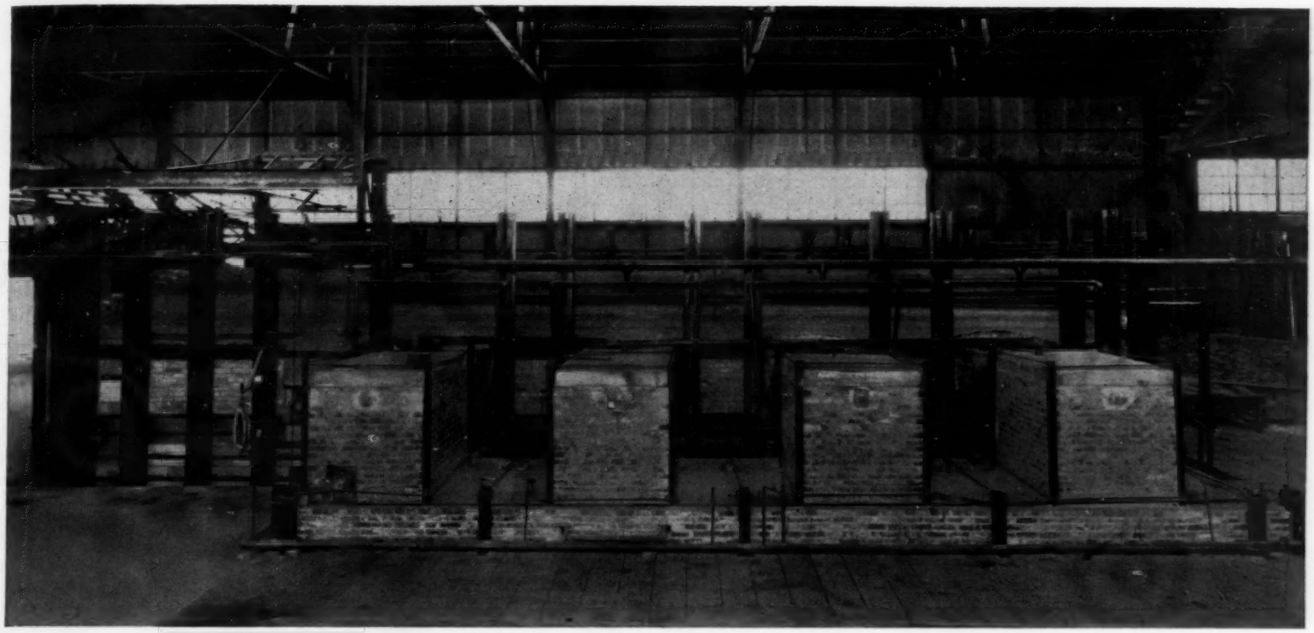
Materials

Glass is an amorphous product of fusion, with a considerable variance in composition. Ordinarily it is considered to be a mixture of an alkaline silicate and the silicate of one or more bases, the alkali being sodium or potassium, the base calcium or lead; sometimes all four elements enter into its composition.

Technical transparent glasses are divided into lime or lead glass, according to the presence of these elements. Bottles and window glass are forms of lime glass. White glass and "opal" glass are those to which materials have been added to produce the desired color effect.

Generally speaking, silica sand constitutes about one-half of the materials that go to make up a glass batch, the balance of the ingredients being soda ash, lime, niter, borax, arsenic and cullet (broken glass). However, in any composition there is no material quite so important as silica sand. It must be clean and commercially free of foreign matter. Grain sizes must be held within definite maximum and minimum limits. One branch of the industry requires that the chemical analysis show silica not under 98.5 per cent, iron oxide not to exceed .05 per cent, and aluminum oxide not to exceed .50 per cent. Some grades of glass production may employ lower qualities, but generally the above specifications assure a high grade product.

The glass industry in Southern Cali-



100-ton regenerative-type tank, showing four of the regenerators and gas burner connections

fornia relied on Belgium sand brought in as ballast up until about two years ago when it was found that certain local sand deposits with the aid of refining facilities produced a suitable material.

Melting Equipment

Furnaces, in which the glass is melted in clay crucibles or pots, are known as pot furnaces. Furnaces, rectangular in shape, where the materials are melted in a refractory line tank, are known as tank furnaces. Pot furnaces are either open or closed and their firing may be direct, regenerative, or recuperative. Tank furnaces are either "day" or continuous working, either intermittently or continuously.

In the regenerative type of furnace, the products of combustion from the furnace are made to pass through fire brick checker-work flues which then become highly heated. The direction of the draft is then reversed by a damper known as a butterfly valve, and the incoming air used for combustion is passed through the hot checker brick. While this operation is taking place, the hot furnace gases are being passed through the generators on the opposite side of the furnace, which has become cooled by the incoming air of the previous run. Thus the burnt furnace gas gives up its waste heat to the checker work, which in turn gives it up to the incoming air and gas, and hastens combustion by raising the fuel temperature nearer its kindling point. In practice this reversal of draft is made every 20 or 30 minutes.

In the recuperative furnace, there is no reversal of draft, but the hot products of combustion pass through clay or metallic tubes, which by conduction give up their heat to the incoming air and gas.

Both types of furnaces have their advantages and disadvantages and the real success and economy of either depends on the class and amount of work to be produced. However, it is a fact that the most common and at the same time the oldest method of recovering waste heat from industrial furnaces is through preheating the air used for combustion, either by regenerators or recuperators.

By virtue of the rather complicated equipment necessary for the operation of regenerators, these have been limited to comparatively large furnaces, and in the glass plants only continuous tanks and some pot furnaces use this kind of equipment. A great number of day tanks and pot furnaces however, are still being operated without any attempt whatsoever being made to recover the heat in the waste gases.

The glass industry is a field that lends itself very aptly to the use of recuperators, and installations for this purpose are increasing in number every day. Recuperators are low in cost, continuous in operation, and require little attention other than periodical cleanings. In addition to day tanks and pot furnaces, recuperators can also be used on pot kilns, glory holes, block heating furnaces, revolving tanks, etc.

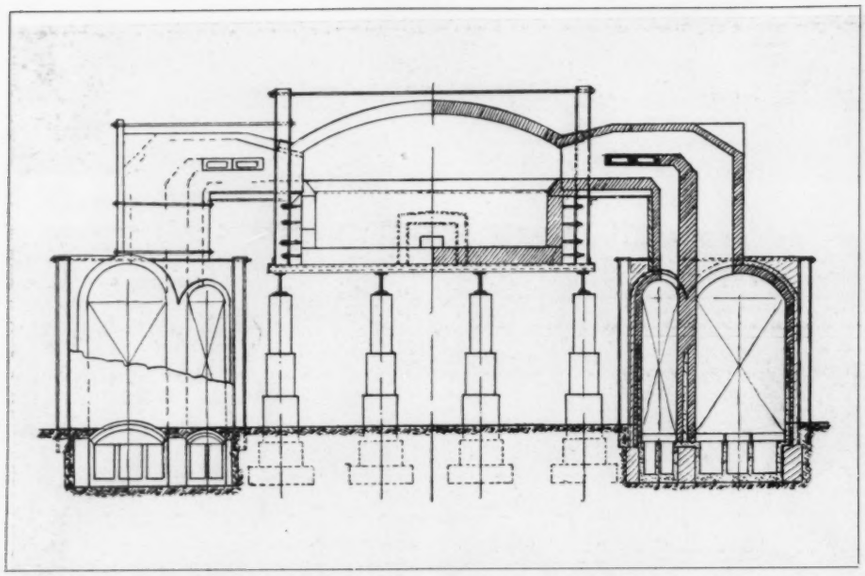
The saving in fuel consumption which may be effected by the use of recuperators depends on the temperature of the waste gases, which otherwise escape through the stack.

In the case of furnaces ordinarily working with a waste gas temperature of 1000°, a saving of approximately 10 per cent can be effected by preheating the air to 500° F. In glass furnaces which eject the waste gases through the stack at temperatures around 2500°F., (and these are frequent) it has been proved that by preheating the air to 1500° F., the fuel bill is cut in half. In many other furnaces, the flame condition created by preheating the air will justify the use of recuperators, irrespective of the direct saving in fuel.

Until a few years ago, recuperators were principally made from refractory clay tiles or tubes, put together in such a way that the waste gases and the air traveled in opposite directions, each in its own passages. The interchange of heat, therefore, took place through a wall of refractory material, which wall in most cases was comparatively thick. Recently, recuperators have been built up of thin walled refractory tubes which, with their high heat conductivity and high temperature limit, are very efficient.

With the development of heat-resisting alloys, metal recuperators made their appearance, and today alloys are available which will withstand a continuous exposure to temperatures up to 2400° F. without sealing.

As the walls of the recuperator between the two gases can be made very thin, and the heat conductivity of the metal is very high, a rapid and highly efficient heat transmission can be effected.



Cross section view of a regenerative-type glass tank

By proper design, the recuperator can be made absolutely leak proof.

The efficiency of the recuperator depends upon the amount of heating surface presented to the hot gases and the air to be heated, and also upon the conductivity of the walls through which the heat is to be transmitted. In metal recuperators, the conductivity of the wall may be neglected, as this quantity is too small, compared to the conductivity of the gases immediately on the plate, to appreciably affect the efficiency. In other words, the resistance against transmitting the heat from the gases to the plate is so much greater than the resistance of the plate itself, that the aim in the design of recuperators, therefore, will be to get the greatest amount of heating surface occupying the smallest possible space. There is a limit to the possibility in this direction, however, and this limit is set by the necessity of providing a passage large enough to conduct the gas and air. Metal recuperators are usually made in the same way as tubular condensers, the waste gases being made to pass around the tubes, and the air to pass through them. The total area of the tubes must, therefore, be great enough to conduct the volume of air required, and the surface is in a set proportion to this area.

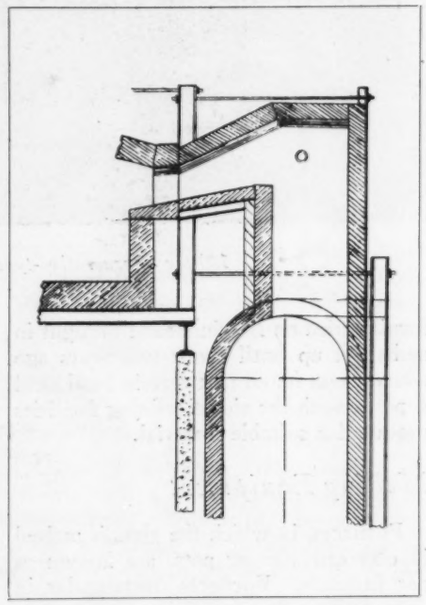
In order to further increase the heating surface without increasing the size of the recuperator itself, a type is now made where the air and gases are conducted through the same chamber at different times. In reality, this works on the principle of the regenerator, the heat in the gases being given up to a series of plates made from heat resisting alloys, after which the air is conducted through the same chamber, thus absorbing the heat previously taken from the waste gases. By working three or more of these chambers in conjunction, a continuous flow is obtained of both the air and the waste gases. A set of valves operated by one common mechanism continually diverts the flow of gas and air from one chamber to another, automatically preventing the two gases from occupying the same chamber at the same time. This type operates as a recuperator, inasmuch as the flow of waste gases and air in relation to the whole heater is continuous and in one direction only; however, the advantages of regenerators and recuperators are embodied in one piece of equipment.

In any kind of glass tank it is doubtful if the preheated air ever exceeds 2000° F. The average is nearer 1800°, which is considered the most economical range. Heating the air necessary for the combustion of 1 cubic foot of 1100 B.t.u. natural gas from 100° to 1800° F. requires about 340 B.t.u. The total heat available for the purpose is 700 B.t.u. This leaves a remainder of 360 B.t.u., which is usually wasted through the stack or by radiation.

For a tank using 1,000,000 cubic feet of gas per day, the recuperator will be approximately 14.75 feet long, 9.5 feet wide and 12.5 feet high. Recuperators can be made with more than 200 square feet of surface per cubic foot of space, including brick walls and casing, and within certain limits the efficiency is proportional to the heating surface.

Air Supply and Combustion

Any quantity of any particular combustible always requires a definite amount of air for complete combustion; if less than this quantity of air is supplied, the combustible will not be completely burnt; if more than this quantity of air is supplied, the combustible will be completely burnt, but the excess of air will act as inert diluting material. Efficient combustion takes place only when the amounts of gas and air supplied the furnace are such that complete combustion of the gas takes place without any excess air being present. In the ordinary glass furnace there is no accurate means of so proportioning the amounts of gas and air supplied the furnace as to get efficient, balanced combustion; the supply of gas is controlled by gas



Cross section of fuel mixing chamber, showing method of throwing flame directly over the bath of glass

regulating equipment, while that of the air is controlled by the stack draft and the temperature differential between the air and the checker brick. Changes in stack draft are ordinarily made, not to control combustion, but merely to modify the distribution of heat between the melting and working ends of the tank by modifying the pressure within the tank. In no other line of manufacture where the cost of fuel is a very important item is so little attention paid to the attainment of balanced combustion as is the case in glass manufacture, and there is no other factor in the use of fuel which can occasion greater heat loss or which can be as readily controlled.

If the supply of air is insufficient beyond a certain point, it is indicated by a smoky flame or smoky stack exhaust, but the presence of an excess of air can not readily be seen by inspection of the flame or the stack gases. Unbalanced combustion acts like poor gas and tends

(Continued on Page 42)

This Intensive Drive *on* Leakage Brought Positive Results

By WM. E. GENTNER

District Superintendent, Southern Counties Gas Company, San Pedro, California

IN 1929 the Southern Counties Gas Company offered two prizes of $500 each to the district or districts in its system which could reduce its unaccounted-for gas totals in the greatest degree. One prize was for volumetric reduction; the other for the lowest amount of unaccounted-for gas per mile of 3-inch main equivalent.

Both prizes, after the year's showing had been checked, went to the San Pedro district of the company—one of eight districts comprising the Southern Counties system in Southern California. In the San Pedro district there are at present 15,200 active meters.

Wm. E. Gentner

Mr. Gentner here tells the story of how this intensive leakage elimination campaign was conducted. Methods of districting the system for quickly lowering leakage at the worst points are of particular interest, and the company estimates that the results achieved will pay for their cost over a three-year period in gas saved.—*Editor.*

ON January 1st, 1929, the San Pedro District of the Southern Counties Gas Company showed a volumetric unaccounted for of 197,758 M.c.f. By December 31st, 1929, this had been lowered to 56,548 M.c.f., a gain of 71.4 per cent for the year. Our loss per mile per month on January 1st, 1929, was 735 cu. ft., and by December 31st, 1929, this had dropped to 134 cu. ft. per mile per month—a reduction of 601 cu. ft. per mile of equivalent 3-inch main. We have 15,200 active meters in our local system at present.

It may be interesting to recount how this result was accomplished. The wholehearted cooperation of every man in our organization was put behind a plan for quickly locating the points in our system where leakage was at its worst. We used maps of the various lines in our district and outlined a series of tests and subtests. The tests were numbered 1, 2, 3, 4, etc., and the sub-tests were designated by a letter added to the main test number—for example, 1-A, 1-B, 1-C.

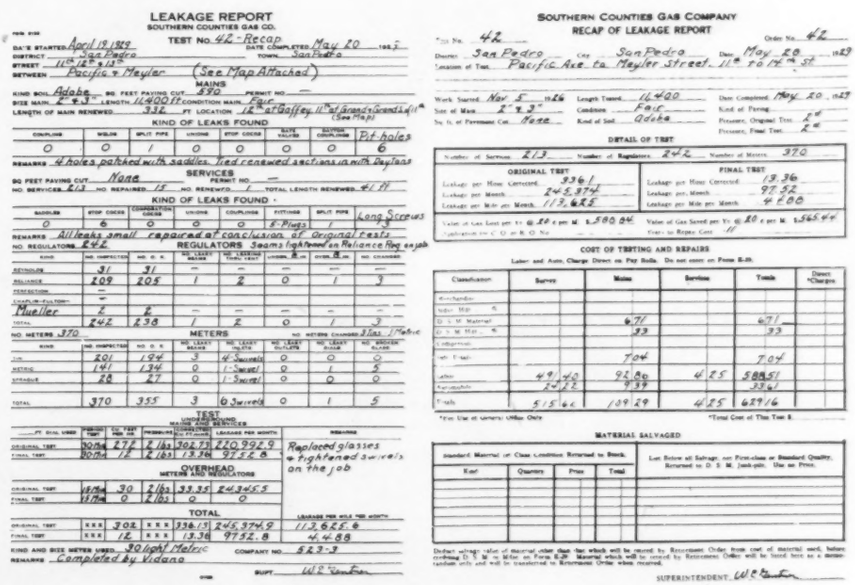
Approximately 1,000 meters were included in each test, with approximately 150 meters in the smaller grouping designated as sub-tests. In each of the larger groups of approximately 1,000 meters, a volumetric pressure chart record is taken at night, for the purpose of obtaining our minimum consumption per hour. In the sub-tests, two daily tests are made when the gas can be shut off from consumers.

The method we used on a district to be tested was as follows:

First we picked out the districts which we thought were our worst, or where our oldest mains and services, or bad soils, prevailed. The next step, and one of the most important before putting on a test, was to check all the gate valves in the test and see that they were holding tight. To be sure of this, we had to cut the main alongside of the valve to find out if the valve held. If it did not hold, we installed a positive shut-off cock. Another thing we were careful to observe in isolating for a test was to see that the supply for the surrounding district had not been discontinued. Our entire district was first given the night tests previously mentioned. Sections which appeared to show large leakage possibilities were first selected for the subsequent tests.

For a test we use a 5,000 cu. ft. volumetric meter mounted on a two-wheel solid tire trailer. On this trailer we have a 1¼-inch pipe support with a long thread which is screwed into a 1¼-inch coupling, welded to the side of the trailer. By this arrangement, we can level up our meter and have it on a sound foundation. We have two 2-inch high pressure steam hose, 10 feet long, which we use to connect up the meter. We use a 12-gallon reservoir on the trailer for extra meter oil. When we make a test with a meter, we shut off all of the valves in the district to be tested, about 10:00 P. M., having all the gas for the test going through the meter until about 5:00 A. M., when we open all the other valves. We made these tests during three consecutive nights, and in that way we got an average minimum consumption per hour, which was duly recorded. After we have inspected and repaired all the leaks in the test, we again go through the same procedure. Subtracting the final test figures from the original test, we have the amount of gas saved.

Between the time we made original and final tests, we make our sub-tests. We found that very nearly every saddle on our mains was leaking; some just a



LEAKAGE REPORT
SOUTHERN COUNTIES GAS CO.
TEST NO. 42-Recap
DATE STARTED April 19, 1929 DATE COMPLETED May 20, 1929
DISTRICT San Pedro TOWN Hamilton
STREET 11th to 14th
BETWEEN Pacific & Meyler (See Map Attached)
MAINS
KIND SOIL Adobe SQ. FEET PAVING CUT 890 PERMIT NO. —
SIZE MAIN 2" & 3" LENGTH 11,400 Ft. CONDITION MAIN Fair
LENGTH OF MAIN RENEWED 332 Ft. LOCATION 12" Rattley, 11th at Grand to Second & 11th (See Map)
KIND OF LEAKS FOUND

COUPLING	WELDS	SPLIT PIPE	UNIONS	STOP COCKS	GATE VALVES	SCREW COUPLINGS	
0	0	1	0	0	0	0	Pit holes 6

REMARKS 4 holes patched with saddles. Tried renewed sections in with Daytons
SERVICES
SQ. FEET PAVING CUT None PERMIT NO. —
NO. SERVICES 213 NO. REPAIRED 15 NO. RENEWED 1 TOTAL LENGTH RENEWED 41 Ft.
KIND OF LEAKS FOUND

NIPPLES	STOP COCKS	CONNECTICUT COCKS	UNIONS	COUPLINGS	FITTINGS	SPLIT PIPE	
0	6	0	0	0	2 Plugs	1	Long Screws 3

REMARKS All leaks small repaired at conclusion of original tests
NO. REGULATORS 242 REGULATORS Seams tightened on Reliance Reg. on job

KIND	NO. INSPECTED	NO. O. K.	NO. LEAKY WHEN TESTED	NO. LEAKY WHEN TESTED	OVER-RUN	NO. CHANGED
REYNOLDS	31	31	—	—	—	—
ROLLINGS	209	205	1	2	0	1 3
PERFECTION	—	—	—	—	—	—
LONDON-TUTTON	—	—	—	—	—	—
Mueller	2	2	—	—	—	—
TOTAL	242	238	1	2	0	3

NO. METERS 370 NO. METERS CHANGED 3 Inst. 1 Mueller
METERS

KIND	NO. INSPECTED	NO. O. K.	NO. LEAKY WHEN TESTED	NO. LEAKY WHEN TESTED	NO. LEAKY OUTLETS	NO. BROKEN GLASS
SIX	201	194	3	4 Swivels	0	0
METRIC	141	134	0	1 Swivel	0	5
SYPHONIC	28	27	0	1 Swivel	0	0
TOTAL	370	355	3	6 Swivels	0	1 5

TEST
METERS AND REGULATORS

	FT. GAS USED	TIME TEST	SQ. FEET PER HR.	PRESSURE (INCHES)	NO. LEAKY OUTLETS	LEAKAGE PER MONTH	REMARKS
ORIGINAL TEST	30764	272	2 lbs	302.73	220,992.9		Replaced glasses & tightened swivels on the job
FINAL TEST	30764	12	2 lbs	13.36	9752.8		

OVERHEAD
METERS AND REGULATORS

ORIGINAL TEST	11764	30	2 lbs	33.35	24,345.5	
FINAL TEST	11764	0	2 lbs	0	0	

TOTAL

ORIGINAL TEST	XXX	302	XXX	336.13	245,374.9	112,625.4
FINAL TEST	XXX	12	XXX	13.36	9752.8	4,488

KIND AND SIZE METER USED 30 Light Metric COMPANY NO. 523-3
REMARKS Completed by Vidaro
SUPT. W E Gentner

SOUTHERN COUNTIES GAS COMPANY
RECAP OF LEAKAGE REPORT
Test No. 42 Order No. 42
District San Pedro City San Pedro Date May 20 1929
Location of Test Pacific Ave. to Meyler Street. 11th to 14th St
Work Started Nov. 5 1928 Length Tested 11,400 Date Completed May 20 1929
Size of Main 2" & 3" Condition Fair Kind of Piping
No. ft. of Pavement Cut None Kind of Soil Adobe Pressure, Original Test 2#
Pressure, Final Test 2#
DETAIL OF TEST
Number of Services 213 Number of Regulators 242 Number of Meters 370

ORIGINAL TEST		FINAL TEST	
Leakage per Hour Corrected	9361	Leakage per Hour Corrected	13.36
Leakage per Month	245,374	Leakage per Month	97.52
Leakage per Mile per Month	113,625	Leakage per Mile per Month	4.488
Value of Gas Lost per Yr. @ 80 ¢ per M.	$ 588.04	Value of Gas Saved per Yr. @ 80 ¢ per M.	$ 565.44
Explanation (w/ C. O. or R. O. No.)		Time to Repair Cost	11

COST OF TESTING AND REPAIRS
Labor and Auto. Charge Direct on Pay Rolls. Do not count on Form S-B.

Classification	Survey	Mains	Services	Totals	Direct *Charges
Foreman					
Insp. Mat. &					
Insp. & M. Material		671		671	
Insp. & M. Men &		33		33	
Compressor					
Test Trailer		704		704	
Labor	49 40	92 80	4 25	586 51	
Automobile	24 22	9 39		33 61	
Totals	515 62	109 29	4 25	629 16	

*Time Use at Generic Office Only *Total Cost of This Test $

MATERIAL SALVAGED

Standard Material or Class Condition Returned to Stock				Last Below all Salvage, not First-class or Standard Quality, Returned to D. S. M. Junk-pile. Use no Price.
Kind	Quantity	Price	Total	

Defect ratings value of material other than that which will be issued by Requisition Order from cost of material used, below nothing D. S. M. to Meter on Form S-P. Material which will be issued by Requisition Order will be listed here as a design random units and will be transferred to Requisition Order when received.
SUPERINTENDENT W E Gentner

Two of the report forms used in connection with leakage program of Southern Counties Gas Company's San Pedro District.

bubble, others 3 or more feet per hour. The same applied to corporation cocks. A large number of these were found leaking a little at the cores. Where the main pressure is less than 10 pounds, we take off the saddle and cock, and weld the service to the main. Welding is now the company's practice on all new services.

We dig up each service in oil and dirt surfaced streets at the main, cut it off and put a test of 50 pounds air pressure from the main to the meter, and if it does not hold at first, we repair it. In our files we keep a house card and a chart of every test made. These are 1-hour charts and the test is on for 15 minutes. If the chart shows a drop in pressure the service is removed or repaired and the final test is made on the same chart in another position. In this way we show the results found and that the service was left tight. In the back of these charts we have a form to be filled out with a complete report.

All services and service risers are brought to the outside of the building. The riser itself is a brass pipe which comes through the ground, which is the weakest point and a possible cause of fires and explosions. While we have the service disconnected the meter set is revamped with swing joints on both sides. The regulator is set outside or else vented to the outside.

For testing mains, we use the bar test system. Four men go down the street over the main, driving down a bar about 2 feet deep, every 10 feet. A man follows with a lighter, which is a piece of 3/8-inch pipe, 4 feet long, with a coal oil torch on the end of it. If he gets a flash or flame, he brings the bar men back and they drive the bars down closer together, locating the point of greatest leakage. The main is then uncovered, and the leak is repaired. If a coupling or small hole is found in the main, we braze it. If the main is found to be in poor condition, we apply for a construction order and replace it. All valves in the vaults are tested monthly with soapsuds for leaks, and if any are found, they are immediately repaired. After the mains, services, meters and regulators are tested for leaks, we put on our shut-off test. For this we use a 400 cu. ft. positive meter, with volume-pressure recording gauge. The meter is fixed with a by-pass and mercury column for high pressure test, or a water column for low pressure, and is then connected up to the main with a hose. This by-pass is around the stop cock on the outlet side of the meter.

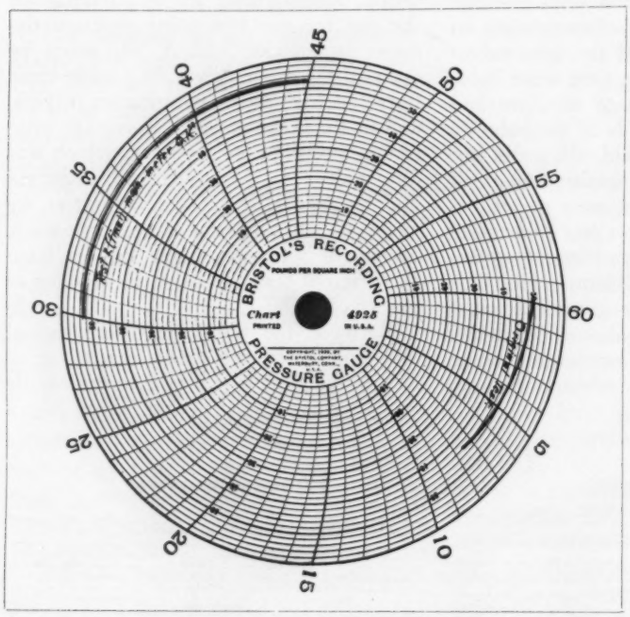
All of the consumers are notified that gas will be shut off at 12:30 or 1:00 P. M. for two hours. All of the meters are blanked at the outlet. The test meter is then observed for 30 minutes, with constant pressure maintained by the use of the by-pass on the outlet of the meter. The stop cocks are then shut off, with the blank still in the outlets, and another 30 minutes of observation is recorded. This gives us the loss in meters and services, also the overhead. If the main and services show no noticeable loss, we work overhead only, or vice versa, as the case may be.

We then turn on all meters and light pilots. At the same time, as a service to our consumers, we send out two men with a water column to test the gas pressure at the appliance. One man goes inside the house, puts on his water column, and the other man goes to the regulator and by means of signals on piping from the man inside he raises or lowers the pressure if conditions require adjustment.

When all sub-tests are made in a test, we again set a large meter for our night test, showing how much we saved. All labor, material and cost used in making the test are shown on our recapitulation sheet. All services, meters and regulators in the test are counted. Different kinds of meters and regulators are noted. The total footage and sizes of main are recorded, and are brought down to a 3-inch main equivalent basis.

On a wall map which shows all of our district we make full notations of the work's progress. After the test is complete, and final test results are computed, they are entered in the proper section on the map, with the amount of unaccounted-for gas left and the date of the final test. This enables us in future tests to know at once the amount of new unaccounted-for.

(Continued on Page 53)



Front of 1-hour chart showing the original and final 15-minute tests. The original test revealed a drop due to leaky coupling. Final test shows results in gas saved due to repair.

SERVICE SURVEY AND TEST

Date 1-21-30

S. O. No. 7622	CHART No. 3976	CITY Wilmington	
Name John Smith	Address 1050-52 Sanford Ave		
Pressure Tested 50	Drop in pressure—Lbs. 6"	Riser outside:— Yes	
Period of Test—Min. 15	Kind of soil Loam	Meter boxed Yes	
Cock at Main	Condition of pipe Good	Size of Service 3/4"	
Cock at Prop. line	Pressure—High	Date installed	
Cock at Curb	Pressure—Low	Meter & Reg. under bldg.	
Location 79' Feet	East North / West South / of E.-K"	St. Ave.	

KIND OF LEAKS FOUND

Leak in Meter None		Leak in Service pipe Pin Hole Coupling	
" " " Fittings		" " " " —Seam	
" " " Regulator		" " " " —Unions	
" " " Stop Cock		" " " " —Rusted out	
" " " Out-let	Cu. ft. per hour		
Service Renewed No	Service repaired Yes	Service retired No.	
S. O. No.	Rep. O. No.	W. O. No.	Ret. O. No.

Remarks: Tested main-meter with 1-hour clock. Original test 2 (Final) OK. test leak to complete record. Retired 3/4" saddle & 3/4" cock cock at main. Brazed on coupling at main. Reset 2-meters, 2-new brass risers 2-regs.

Completed by Ritchie

Back of 1-hour test chart, giving record of location and leakage work done.

A Travelogue of

New Orleans

for gas men soon to visit this romantic metropolis of the South

By J. C. BARNES

Director of Advertising
New Orleans Public Service, Inc.

On Page 43 of this issue will be found the complete tentative program set up for the A.G.A. Natural Gas Department Annual Convention, meeting at New Orleans, May 5-8, 1930. Through the courtesy of the author, J. C. Barnes, we offer New Orleans-bound gas men the following excellent "travelogue" of the intriguing convention city.—*Editor.*

NESTLING in the crescent bend of the mighty Mississippi lies the City of New Orleans, the metropolis of the South, America's second port, and "America's Most Interesting City."

It was on this spot in 1716 that Jean Baptiste Le Moyne de Bienville, hardy French pioneer, and representative of the French crown, built the City of New Orleans. The city that Bienville built has been the mecca for decades of national and international tourists. It was the visitors who gave New Orleans the name of "America's Most Interesting City."

They gave it that name because it was here they found unchanged—preserved through more than a century—the buildings, the entire settings in which the dramas, the romances, the tragedies of bygone ages were enacted.

In New Orleans the imagination unaided can construct again the very scenes the sightseer has read about, talked about, heard about since childhood days in the history class—the fantastic nights of the famous quadroon balls—the awesome days of slave auctions and later the days of the carpetbaggers—the picturesque pirates of Lafitte as they came to the aid of Andrew Jackson in the Battle of New Orleans—the beautiful typical Southern manses of the "land o' cotton" and sugarcane—the curious courtyards and iron-trellised balconies of the ancient days of Spanish and French rule—scenes without end.

In the waters that surround New Orleans are to be found contrasts that

(Continued on Page 54)

ILLUSTRATIONS

UPPER: A page from the past, in modern New Orleans—scene at one end of the old French Market.

RIGHT: At the heart of old New Orleans—the Place d' Armes. It was here that the Mississippi Valley had its beginnings, back in 1718, as laid out by Bienville. Left to right, the view shows: The Cabildo, St. Louis Cathedral, Presbytery, lower Pontalba Apartment. In the foreground, Jackson Square and monument.

Skyline of modern New Orleans, seen from the waterfront

The Gas Company Goes *Moderne*

By H. ELLIOTT TAYLOR

San Francisco Manager, Western Gas

AT LEFT:
Straight lines, angles, contrasting tone values —all of these emblems of the "moderne" decorative treatment are here to be observed in the Portland Gas and Coke Company's newly built office at Salem, Oregon.

RESPONDING even though somewhat tardily, to a recognition of the need for conducting its own offensive on public opinion, the gas industry has in recent years been gradually adding its voice to the repercussions of advertising and publicity thunder that are rolling over the battlements behind which sits the consumer and his entrenched purchasing power.

The present volume of gas industry advertising and publicity makes that of former time dwindle into insignificance —though there is still much to be desired in this direction. National and regional associations now add their voices to the growing individual company chorus; industries hear specialized messages through these cooperative campaigns; domestic consumers are approached through radio, outdoor advertising, and other modern avenues. Local gas companies, in turn, are stimulated to redouble their own efforts by the national and regional drives and the whole publicity movement gains momentum.

There is much encouragement in this increased publicity and advertising volume which the industry now levels at the potential gas market. However, mere volume is not enough. We should be fully as closely concerned with the *manner* in which the industry is making its appeal. "Modern" is the one word which should sum up the present-day gas company contact with its public. Modern advertising. Modern office buildings. Modern sales floors. A modern spirit of company cooperation in community enterprises. For gas *is* modern, and the industry must leave no stone unturned to make that fact stick with its public.

If the public were to judge our fuel from the manner in which some companies exploit it, we must admit that the answer would be—"Gas is obsolete." Our public has grown up around us, while our methods of gas promotion in some instances remain in the era of the zinc bath tub and the spring wagon delivery service. These instances, happily, are growing more infrequent. More companies see the wisdom of using modern agencies and methods in their public contacts. Whole sections now advertise cooperatively with the modern slant, as is the case on the western coast where the Pacific Coast Gas Association is using radio, trade press and outdoor advertising around the central theme of "Gas, the Modern Fuel." And individual companies are rapidly falling into line.

One utility which has caught the spirit of the day is the Portland Gas and Coke Company, serving a progressive community in the Pacific Northwest. On the opposite page are reproduced a number of advertisements which are representative of this company's methods. They demonstrate that this utility has applied the modern touch and departed radically from the well-worn grooves in which much utility advertising has been allowed to run.

The whole field of advertising has gone modern. In fact, it has gone further than that—it has gone *moderne,* and the Portland Gas and Coke copy reflects the new trend. Any reader of newspapers and periodicals knows of this revolution which has overtaken advertising. Perhaps the jaded, over-sold eye of the ultimate consumer is to blame for the new standards of appeal, but, at any rate, advertising has departed from stereotyped paths.

EXAGGERATION of effect is its new keynote—seen in typefaces, in layout, in photographic treatment —and this tone carries into the copywriting itself to round out the *moderne* bid for attention. Advertising now aims at creating an impression of the object or service advertised, even though some meticulous literal detail of the article in question may be sacrificed to more effectively display what it will do for the user.

Portland Gas and Coke advertising works in the new manner for this central impression—that gas is a modern servant, supplying comfort and convenience through modern appliances.

That the Portland utility is very much in tune with the times is shown in more ways, however, than in its type of advertising material. There is, for instance, the new store recently opened in Salem. Here the *moderne* style of decoration is carried throughout, from the strength and simplicity of the Neon "Gas Company" sign which first meets the eye in approaching the building, to the rest room in an alcove off the back of the display room, fitted with furniture of latest design. Walls of paneled wood, silver-fluted columns and other appurtenances more often associated

(Continued on Page 57)

New York
"Goes Electrolux"
Within 7 months in this great city, the world's most competitive market, 154 new apartment buildings chose the ELECTROLUX GAS Refrigerator
11,542 in all
Let's follow the lead and be real metropolitan
No Moving Parts
Sold and installed by
PORTLAND GAS & COKE CO.
Sixth & Salmon
only 3 more days
to get a genuine
RUUD GAS TANKHEATER
at only 75¢ down
PORTLAND GAS & COKE CO.
SIXTH AND SALMON
GAS
The Greatest Servant of all!
Get Your SMOOTHTOP here
Cooks Faster, Better, Cheaper
"Surprise Party Now On"
Surprise the Wife
with a modern Smoothtop Gas range
at the GAS Company
This week a surprise allowance for your old range
Portland Gas & Coke Co.
Sixth & Salmon
Gas
the world's greatest fuel
SPEED
for waterheating
refrigeration
cooking or
house heating
PORTLAND GAS & COKE CO.
May We Serve You?

Advertising copy of the Portland Gas and Coke Company, Portland, Ore., reaches for the attention of the reader in a compelling, modern style, evident in the examples reproduced above.

Economic Aspects of

PIPE PROTECTION

By S. W. BINCKLEY

Special Engineer
Southern California Gas Company

IN A broad sense, the economic aspect of the problem of protecting pipe lines against corrosion may be stated as follows:

The protection of pipe from corrosion is economically sound provided the ultimate service life of each dollar invested in protected pipe lines is longer than the ultimate service life of each dollar invested in unprotected pipe lines, under identical conditions. This axiom is strictly limited by the following conditions, which should never be lost sight of:

1. If the useful life of unprotected pipe is as long or longer than the useful life of the pipe line, added cost in the form of pipe protection is not justifiable. The only justification for prolonging the life of pipe beyond the useful life of the pipe line is when it is found that the increase in salvage value of the pipe, due to protection, is greater than the cost, plus interest and depreciation charges, of the protective covering used. Under normal conditions this need not be considered in the case of a distributing company, but a transmission or production company may properly consider this point in deciding upon the advisability of protective coverings.

2. The second limitation under the economic axiom may be stated as follows:

"If added fixed charges assignable against cost of pipe protection are greater than the decrease in the depreciation annuity due to resulting increase in life of the protected pipe, the added cost of protecting the pipe is not justified and the investment is not economically sound."

For example, it may be assumed that the life of unprotected steel pipe line in a given soil is 10 years, and its cost per foot is $1.00. Another assumption may be made that a pipe made of far superior metal is used, and its life in the same soil is 30 years and the total cost of such a line is $2.00 per foot. Question: Is the increase in cost justified? This can be answered by calculating the fixed charges on, say 1000 feet of line, as follows:

Cost of steel pipe line under the first assumption	$1,000.00
Depreciation annuity, 6% S. F., 10-year basis at 7.587%	75.87
Return on investment at 8%	80.00
Total annual fixed charges	$ 155.87
Cost of steel substitute line under the second assumption	$2,000.00
Depreciation annuity, 6% S. F., 30-year basis at 1.265%	$ 25.30
Return on Investment at 8%	160.00
Total annual fixed charges	$ 185.30

In this case, despite the fact that the life of the line was increased by 300 per cent at an increase in cost of only 100 per cent, the proposition is economically unsound because the total annual charges are greater for the pipe line having the longest life. This is, of course, an exaggerated case and is used merely to illustrate one of the economic limitations of the general theory.

It will be noted that no consideration has been given the fact that it is sometimes more costly to renew or replace a main than to lay a new one in a similar location. Although the cost of maintaining service while the renewal work is in progress is sometimes high, it is believed that this can be safely disregarded in dealing with pipe protection. At best, the costs of pipe, labor, haulage, etc., 15 or 20 years hence are uncertain items and are of higher importance than is the element of cost referred to above. Since the major elements of cost in the future are unknown, consideration of minor and indeterminate costs is futile.

Permissible Expenditure For Pipe Covering

It is plain that no intelligent studies or reliable estimates can be made of the amount of money which economically can be spent for pipe protection unless these studies are based upon data comprised in the following elements:

1. Probable physical life of unprotected pipe.

2. Probable extension in physical life, due to use of protective covering.

3. Cost installed, of unprotected pipe line.

4. Cost installed, of protected pipe line.

The cost elements are either known, or can be easily determined. The first two items are highly important and, if not already determined, should be. There is a lamentable lack of published data covering these two points, and so far as the writer knows, there are practically no data of unquestioned reliability available. Since soil conditions vary widely on the Pacific Coast, comparison of data covering one location with data

MR. BINCKLEY'S discussion revolves about the central fact that the gas industry has failed lamentably in the primary task of getting basic data on which to establish its pipe protective practice. The need for gathering, correlating, and analyzing these data prompts the author's remarks.

S. W. Binckley

As a part of the paper certain methods are offered for conveniently determining upon economic investment in protective agencies. These methods pre-suppose that the basic data on life of pipe under varying soil conditions are available.

Many will undoubtedly differ with Mr. Binckley's conclusions, but there can be no escaping his constructive criticism that we must go after the underlying facts on soil characteristics, pipe life, and pipe protective materials. *Western Gas* will welcome further discusion in its columns on this all-important subject.

Mr. Binckley's paper was originally delivered before the Distribution Committee of the Pacific Coast Gas Association's Technical Section at the February conference in Los Angeles, Calif.—*Editor.*

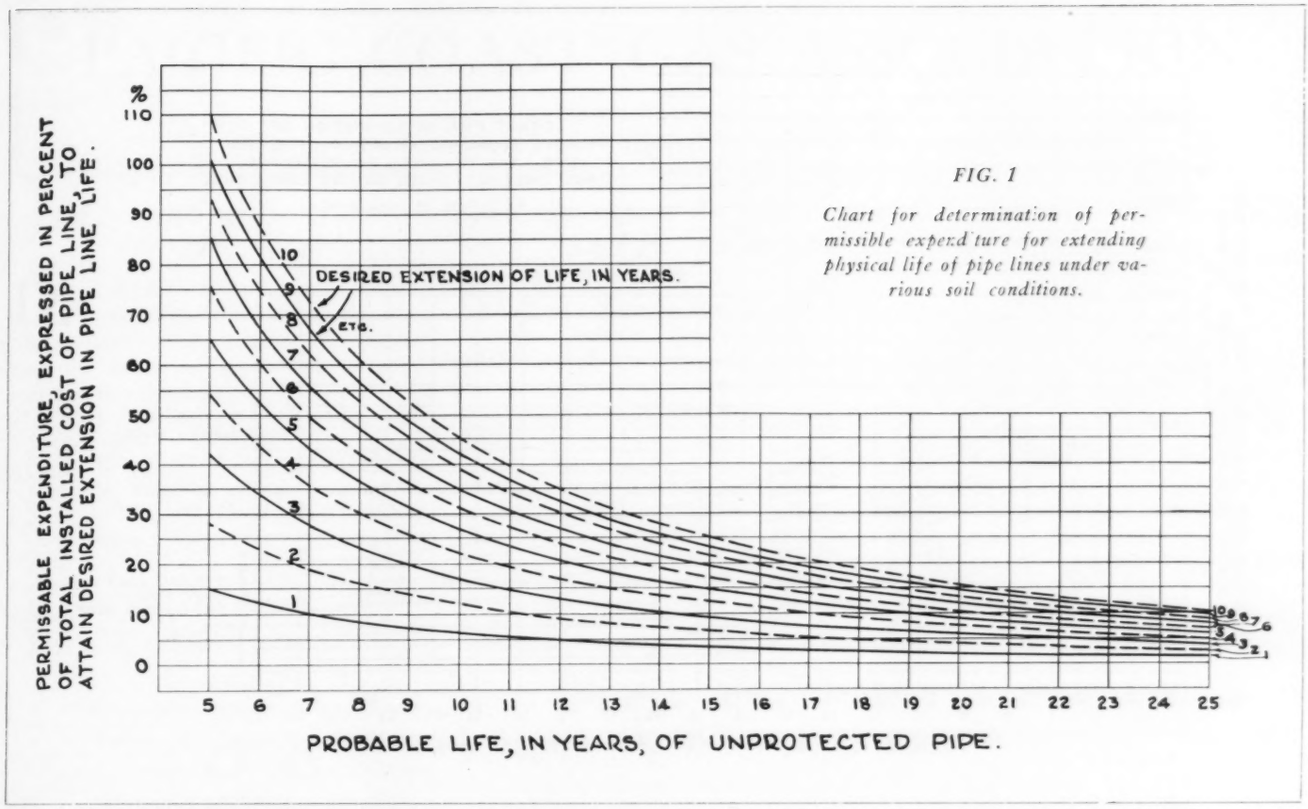

PERMISSABLE EXPENDITURE, EXPRESSED IN PERCENT OF TOTAL INSTALLED COST OF PIPE LINE, TO ATTAIN DESIRED EXTENSION IN PIPE LINE LIFE.
%
DESIRED EXTENSION OF LIFE, IN YEARS.
ETC.
PROBABLE LIFE, IN YEARS, OF UNPROTECTED PIPE.

FIG. 1

Chart for determination of permissible expenditure for extending physical life of pipe lines under various soil conditions.

covering another, must be made with caution.

We know that some pipe will last only a few years, while other pipe will last 25 or 30 years, or even longer. Most of our experience has been with pipe having but a short life, which naturally tends to over emphasis of the importance of corrosion. It is equally true that we know that protective covering must prolong the life of pipe lines—this has been determined in the laboratory and in a few special field tests. However, there is a decided lack of definite knowledge regarding average conditions and the average life of pipe lines which constitute our distribution systems. Before adopting an extensive program of pipe line protection it would be wise to establish the essential facts concerning the life of pipe lines and the effectiveness of pipe line protection as practised.

The problem may be divided into two phases:

1. Determination of probable life of unprotected pipe.
2. Determination of probable effect-

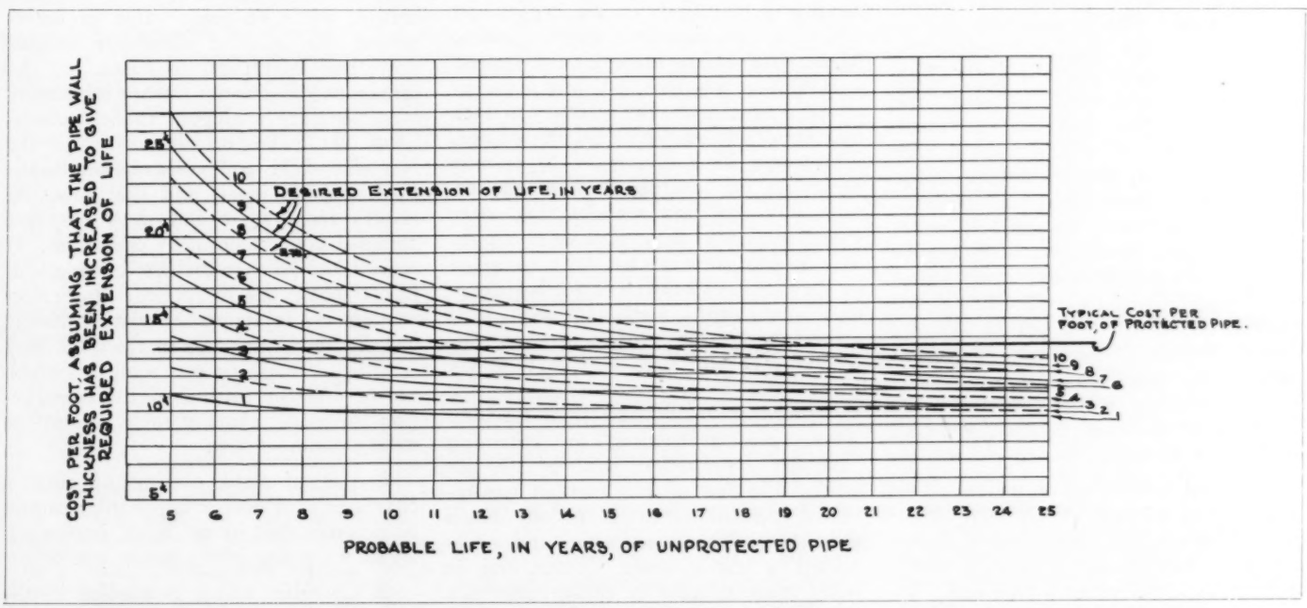

COST PER FOOT, ASSUMING THAT THE PIPE WALL THICKNESS HAS BEEN INCREASED TO GIVE REQUIRED EXTENSION OF LIFE
DESIRED EXTENSION OF LIFE, IN YEARS
TYPICAL COST PER FOOT, OF PROTECTED PIPE.
PROBABLE LIFE, IN YEARS, OF UNPROTECTED PIPE

Fig. 2. Chart for determination of relative economic values of increased pipe wall thickness and protective pipe coverings under various conditions—for 1¼-inch pipe.

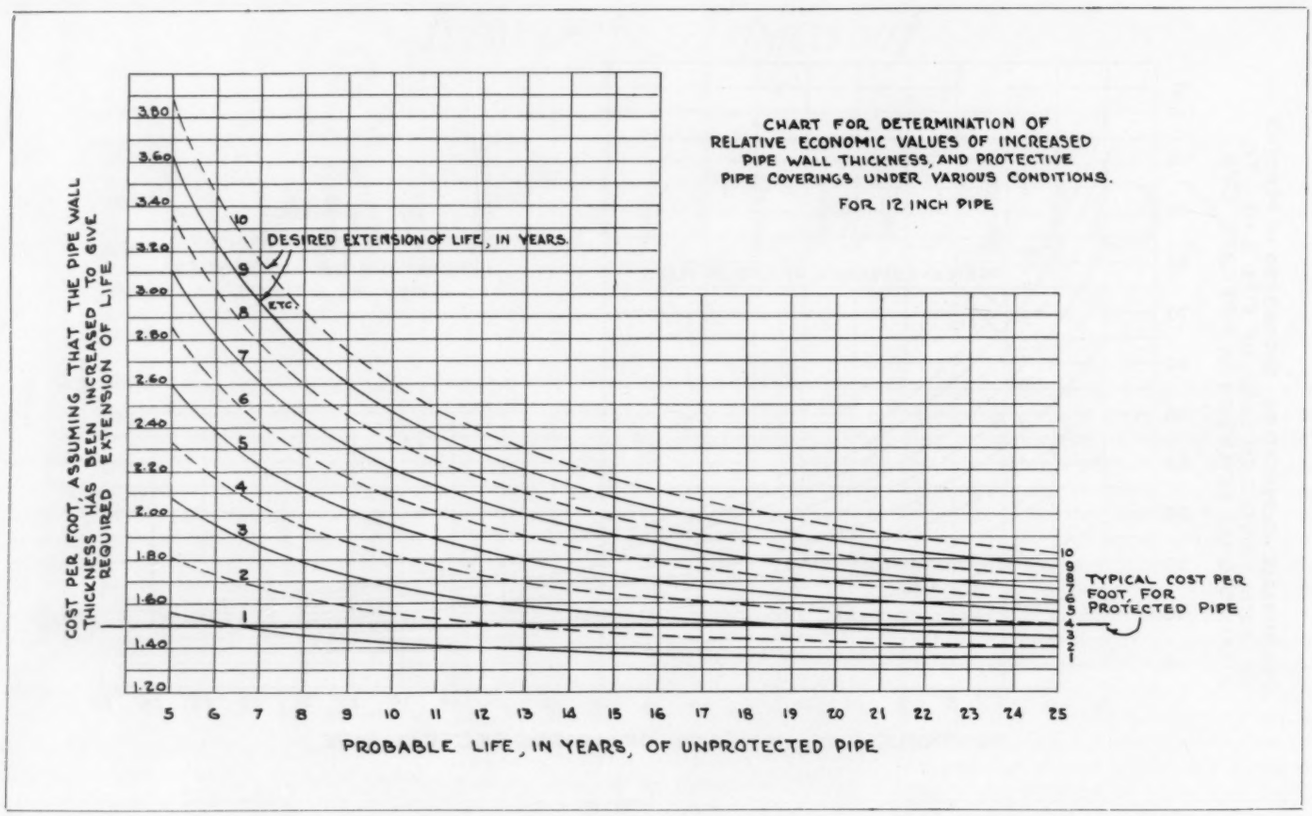


CHART FOR DETERMINATION OF
RELATIVE ECONOMIC VALUES OF INCREASED
PIPE WALL THICKNESS, AND PROTECTIVE
PIPE COVERINGS UNDER VARIOUS CONDITIONS.
FOR 12 INCH PIPE
COST PER FOOT, ASSUMING THAT THE PIPE WALL THICKNESS HAS BEEN INCREASED TO GIVE REQUIRED EXTENSION OF LIFE
DESIRED EXTENSION OF LIFE, IN YEARS.
(ETC.)
TYPICAL COST PER FOOT, FOR PROTECTED PIPE
PROBABLE LIFE, IN YEARS, OF UNPROTECTED PIPE

Fig. 3

iveness, under field conditions of protective coverings.

In determining the probable life of unprotected pipe lines, there are several courses open:

a. A study of actual renewals or replacements made. As mentioned above, this will almost invariably result in the establishment of an average life which is very short. This is naturally due to the fact that the pipe laid under the worst soil conditions is the pipe which is the first replaced. Moreover, the major part of pipe line renewals made to date by one utility have been due to causes other than physical failure of the pipe. Among these causes may be mentioned, obsolescence, inadequacy, street grade changes, installation of expensive paving over moderately old mains, storm drain installations, etc. Another disadvantage of this method lies in the fact that California utilities have expanded rapidly into new territory, and experience in the old sections is not a reliable guide to what may be expected in the new areas.

b. Visual inspection of mains. This is a favorite method widely used by expert appraisers and others, but it is useless as a method for accurately determining the condition of a pipe line. Inasmuch as it is practically impossible for two or more experienced, honest and unbiased experts to arrive at the same conclusion regarding pipe condition, it is plainly unwise to accept the opinion of the average fitter or foreman.

c. Actual field measurement of corrosion. This method, has been successfully adopted by one utility. It consists of thoroughly scraping and wire brushing the pipe until it is bright, and measuring the depth of the deepest pit with a micrometer depth gauge. Measurements are made to the nearest 1/1000th of one inch. When made by a well trained man, the accuracy of such measurements can not be questioned. There may be a divergence of opinion regarding the interpretation of the results, but the fact remains that after a certain period of years, a certain pipe, in a specific location has been corroded to the extent of one-third, one-half, one-tenth, etc., of its wall thickness. The utility doing this work makes the inspections at the time service taps are made, and as a consequence, obtains measurements made entirely at random. Thus, the probability of obtaining "average" observations is about 100 per cent. The use of this method has revealed conditions of corrosion which were heretofore unsuspected and unreported by service crews. There may be other more reliable or cheaper methods of obtaining this information, but the writer knows of none.

Passing to the determination of the probable effectiveness of protective covering, we find a comparatively simple problem.

To date, the study of protective coverings has been confined largely to laboratory tests and comparisons, supplemented by small scale field tests or carefully prepared specimens. This procedure, while of great value in determining the relative values of various protective coverings, is based on the erroneous assumption that laboratory conditions are analogous to field conditions. It makes no allowance for the fact that field and construction conditions are not ideal, and that practical results are sure to fall short of those obtained under laboratory conditions. It is well known that the best coating will fail, if not properly applied. Imperfect coating and injury to the coating during installation of the pipe in the ditch may be due to many causes, some of which are beyond the control of the construction foreman. Among these causes, the most prominent are:

1. Use of field coating of such a character that proper application cannot be accomplished in the field; impossibility of wrapping joints, bends, etc.

2. Covering which is applied in the yard may be so weak that care in transit

(Continued on Page 60)

PACIFIC COAST GAS ASSOCIATION

447 Sutter Street, San Francisco, California

A Department Conducted by Clifford Johnstone, Managing Director

Accounting Section Organization

D. G. MARTIN of San Francisco, general chairman of the Association's Accounting Section, announces that the following accounting committees are functioning:

Fixed Capital Records

R. W. Baily, Chairman, Southern California Gas Company.
R. F. Allen, Pacific Gas and Electric Company.
C. D. Cushman, Los Angeles Gas and Electric Corporation.
Lewis Duncan, Portland Gas and Coke Company.
C. S. Hall, San Diego Cons. Gas and Electric Company.
H. Painter, Tucson Gas, Electric Light and Power Company.
M. W. Thernes, Spokane Gas and Fuel Co.
Oakley Honey, Southern Counties Gas Co.

General Records

A. T. Kelly, Chairman, Pacific Gas and Electric Company.
N. H. Bradshaw, Los Angeles Gas and Electric Corporation.
N. J. Fabel, Tucson Gas, Electric Light and Power Company.
B. H. Hoke, Spokane Gas and Fuel Company.
C. C. May, San Diego Cons. Gas and Electric Company.
B. H. Parkinson, Portland Gas and Coke Company.
W. Ingram Parke, Southern California Gas Co.
W. J. McCoy, Southern Counties Gas Co.

Statistics

Geo. F. Mackenzie, Chairman, Portland Gas and Coke Company.
P. A. Bailey, San Diego Cons. Gas and Electric Company.
I. R. Hoag, Spokane Gas and Fuel Company.
H. Painter, Tucson Gas, Electric Light and Power Company.
J. M. Rogers, Pacific Gas and Electric Company.
W. C. F. West, Los Angeles Gas and Electric Corporation.
A. B. Cates, Southern California Gas Co.
Joseph Sodoma, Southern Counties Gas Co.

Purchasing and Stores

Geo. N. Riblet, Chairman, San Diego Cons. Gas and Electric Company.
J. W. Cook, Pacific Gas and Electric Company.
Jas. G. Haskins, Portland Gas and Coke Company.
Wm. Maddock, Los Angeles Gas and Electric Corporation.
L. H. Prentiss, Tucson Gas, Electric Light and Power Company.
J. L. Ronetch, Spokane Gas and Fuel Company.
A. R. Trautwein, Southern California Gas Co.
W. Giese, Southern Counties Gas Co.

Classification of Accounts

C. H. Geiser, Chairman, Southern Counties Gas Company.
J. M. Bourus, San Diego Cons. Gas and Electric Company.
H. Painter, Tucson, Gas Electric Light and Power Company.
E. N. Simmons, Los Angeles Gas and Electric Corporation.
M. W. Thernes, Spokane Gas and Fuel Company.
W. E. Robbins, Southern California Gas Co.

Customers' Records

O. L. Moore, Los Angeles Gas and Electric Corporation.
W. E. Cook, Spokane Gas and Fuel Company.
R. J. Fabel, Tucson Gas, Electric Light and Power Company.
A. R. Foster, San Diego Cons. Gas and Electric Company.
P. C. Miller, Pacific Gas and Electric Company.
F. C. Ingram, Southern California Gas Co.
F. F. Dehn, Southern Counties Gas Co.

A Committee on Butane And Propane

M. R. THOMPSON, Chairman of the Natural Gas Committee, Technical Section, has appointed the following sub-committee to study the production and utilization of butane and propane as it affects the gas industry:

F. A. Hough, Chairman, Southern Counties Gas Company.
A. B. Allyne, Southern Counties Gas Company.
C. D. Aseltine, Southern California Gas Company.
R. L. Cook, Southern California Gas Company.
F. M. Cota, San Diego Cons. Gas and Electric Company.
Maurice Dorfman, Southern California Gas Company.
Ralph Haun, Southern California Gas Company.
D. D. Purrington, Standard Oil Company of California.
Ted Rosebaugh, Shell Oil Company.
C. E. White, San Diego Cons. Gas and Electric Company.

Association Calendar

Annual Northern Conference:
At Seattle, Wash.—June 26-27.

Joint Conference:
With Arizona Utilities Association—Arizona Biltmore Hotel, near Phoenix—April 16-19.

37th Annual Convention:
Huntington Hotel, Pasadena, Calif.—September 9-13.

Radio Baby Popular *with* Listeners-in

LITTLE red-headed Clayton Murdoch Burns, the first Radio Baby, who was introduced to women radio fans by the Pacific Coast Gas Association over the Pacific Coast network of the National Broadcasting Company, has aroused the mother-love in every listener's heart, if one can believe the scores of effusive letters being received daily by Helen Webster, the little fellow's radio godmother. Miss Webster introduced Baby Burns on February 12, and the next week, February 19, announced that the Radio audience would be permitted to name him. Thousands of names were submitted during the following three weeks. Seventeen hundred and forty-four letters were received during this period, each one suggesting from one to 50 names. The winning name was announced by Miss Webster on March 12 in the following words:

"I hardly know where to begin—but I'm sure if I don't tell you *first* of all the name that has been chosen for our Radio Baby you will be highly indignant, so here it is:

"Our child's name is to be Clayton Murdoch Burns — spelled C-L-A-Y-T-O-N, Clayton, M-U-R-D-O-C-H, Murdoch. That was the unanimous choice of a committee including the baby's parents, representatives of the gas companies, and myself, Helen Webster—little Clayton's radio godmother.

"Now I shall tell you *why* this name was chosen from the *thousands* that were submitted by admirers of our little redhead, throughout the Pacific Northwest. Then, a little later, I shall tell you *who* was the fortunate radio-listener who suggested the winning name, and also give you the names of the two other members of our radio audience who will likewise be rewarded.

"The names, Clayton and Murdoch (which were chosen for the baby), are both famous in the history of gas fuel.

"The Reverend Dr. John Clayton, Deal of Kildare, in about 1650 distilled some coal over an open fire and discovered what he called the "spirit" that resides in coal. This spirit was invisible, but it issued forth in a stream which caught fire and burned fiercely.

"He filled a number of containers with the gas and kept them for a considerable time, amusing his friends by punching holes in the containers and setting fire to the "spirit" which was released. He remarked, 'This was surprising, because no one could discern any difference in appearance between these containers and those which were filled with air.' Dr. Clayton was probably the first man to manufacture and store gas.

"The second name, Murdoch, is equally appropriate. William Murdoch, in the year 1792, began experiments which led to the manufacture of gas and its use for home-lighting in 1797.

"In 1802 a public display of gas lighting was made in London, and a writer of that day said: 'The illumination on this occasion was one of extraordinary splendor.'

"And so the name of Clayton Murdoch, combining the surnames of these co-discoverers of gas, is especially appropriate from the viewpoint of your gas company who sponsors this program.

"Also, as I know you will agree, the two names are very pleasing, in combination with the family name of Burns—Clayton Murdock Burns. The chosen name has dignity too—it is a name of which our radio baby can always be proud when he has grown to manhood. And finally, the Scotch origin of the two names is especially appropriate for the Burns family.

"The winning name was suggested by Mrs. Richard Piehl of 4506 Venice Boulevard, Los Angeles.

"Mrs. Piehl (spelled P-I-E-H-L) must have done some painstaking historical research to discover the facts upon which to base her suggestion.

"I congratulate her upon her success, and she also has the congratulations and best wishes of the Burns family and the officers and employees of the Los Angeles Gas and Electric Corporation, by whom she is served with the modern fuel, gas.

"Other gas companies who collaborate with the Los Angeles Gas and Electric Corporation in presenting these programs also extend their congratulations.

"As a reward for Mrs. Piehl's interest and success, she will receive her choice of a beautiful new gas range with oven heat control, or a gas radiant heater or a gas automatic water heater.

"But I also have some more good news. Two other radio listeners are to participate in the awards.

"Mrs. L. W. Richter, spelled R-I-C-H-T-E-R, of Gresham, Oregon, had the same thought as Mrs. Piehl in suggesting that Baby Burns be called William Murdoch, after the man who is generally recognized as being the father of the gas industry.

"Several women suggested the name CLAYTON for its own sake, as being appropriate for a wee red-headed Scotchman. The first to register this name was Mrs. Dorris Perkins, spelled P-E-R-K-I-N-S, of 3048 Thirty-Second Street, Sacramento, California.

"Both Mrs. Richter and Mrs. Perkins will be invited by their respective gas companies to select, as a gift, any gas appliance costing up to $100.

"Mrs. Richter's gift will come from the Portland Gas and Coke Company; Mrs. Perkins' from the Pacific Gas and Electric Company."

Future radio talks will feature little Clayton Murdoch Burns and tell in detail how his health and comfort are protected and his mother's work lightened by the many gas appliances installed in the Burns' home.

Enthusiasm Prevails at Tacoma Session

THE meeting held by the Commercial Section at Tacoma on March 21 was one of the most enthusiastic gatherings the Northwest men have ever conducted. Sessions were at the Tacoma Hotel, and were opened by J. Earl Jones, chairman of the Section. C. Y. Bowers, vice-president and general manager of the Washington Gas & Electric Company, welcomed the delegates to Tacoma on behalf of his organization. Ralph W. Coblentz, assistant manager of the company, was in charge of arrangements for the conference.

Almost everyone present made some contribution to the program of addresses and discussion, and optimism for the current growth of the industry was the keynote. One sales manager of a 10,000-meter property announced that he would sell between 800 and 1,000 automatic storage-type water heaters this year, and other sales quotas were presented, indicating gains above normal for 1930.

A dinner in the Stone Room of the Tacoma Hotel, with 70 delegates attending, concluded the meeting. Capt. A. E. Higgins of the American Gas Association delivered the dinner address.

Association Membership at a Bargain

ON April first each year two things happen to the membership roll of the Association. First, we go through our books and clear out the deadwood, leaving no one whose dues for 1930 are not fully paid. Second, we reduce the dues for the balance of the fiscal year (to September 30, 1930) to half price, or $2.50.

This makes April an excellent month for you to induce your friends and coworkers to join the Pacific Coast Gas Association. It is a bargain, for the two best meetings of the year are yet to come—the Northern Conference in Seattle on June 26, and the Annual Convention in Pasadena starting on September 9. Membership now brings *Western Gas* for the balance of the year and a copy of the 1930 Proceedings.

The Association has no membership committee, under the belief that everyone who is of the industry and intends to stay in it will have the acumen to observe that membership in the Association is essential to his education and advancement. If you know any gas men who are not now Association members, call this to their attention. You will be doing them a favor if they are the right sort.

Gas *in* Glass-Making

(Continued from Page 32)

to reduce furnace efficiency by decreasing the maximum temperature attainable and by abstracting a greater amount of heat from the furnace than would be lost were the combustion balanced.

If the amount of air used is insufficient for complete combustion, all the fuel value of the gas is not rendered available, because part of the gas remains unburnt, and consequently the maximum flame temperature is not attained and fewer heat units are available for transfer to the glass and tank. If the amount of air used is greater than that which is necessary for complete combustion, all the gas is completely burnt so that all the availabe heat units are set free, but the combustion is diluted by the excess air and the heat units cannot go as far in raising the temperature of the burning gas because of this dilution; this serves to decrease the maximum flame temperature, and thus to decrease the efficiency of transfer of heat to the glass. By increasing the amount of waste gas leaving the furnace at melting temperatures, heat is taken away from the furnace which otherwise would go to the glass and walls, and in fact this acts like increased radiation from the furnace; and by increasing the volume of waste gas, the stack loss is increased. A similar effect is produced by the steam used for oil atomization.

In practice, the heat loss from unbalanced combustion is much greater from the presence of excess air than it is from incomplete combustion. However, as incomplete combustion is likely to have an undesirable effect on glass conditions, it is better to err slightly on the side of excess than of insufficient air. By maintaining a check on the composition of the waste gases, the amount of excess air used should be controlled; the oxygen content due to excess air should not exceed 1 per cent to 1½ per cent. It should be remembered that 1 per cent of excess oxygen means about 5 per cent excess air. An analytical recording instrument for glass furnaces is very desirable; in any case, the waste gas composition should be checked often by the analysis of separate samples taken at different periods of operation. With a large air excess, the regenerators, even if they are normally efficient, are unable to fully preheat the increased volume of incoming gases, which results in still further decrease in furnace efficiency. A large air excess is usually caused by an excessively high stack draft; the low furnace pressure resulting from the high stack draft may cause cold air to be drawn in through the doghouse and other furnace openings, thus increasing the chilling effect on the furnace.

While the quantity of oxygen in the flue may appear to be small, a relatively larger percentage of excess air is present, as shown in the following table, which is for natural gas with complete combustion:

Per cent of Oxygen in Flue Gas	Per cent of Excess Air Present
0.0	0
1.1	5
2.0	10
2.8	15
3.6	20
5.0	30
6.1	40
7.1	50
9.2	75
10.5	100

The following table indicates the reduction in efficiency due to excess air:

Per cent Excess Air	Flue Temp. F°	Per cent Loss
10	500	20.0
10	1000	31.7
10	2000	57.0
25	500	21.0
25	1000	34.2
25	2000	63.0
50	500	23.5
50	1000	39.2
50	2000	73.0
100	500	27.0
100	1000	48.0
100	2000	93.5

Insulation

Theoretically, the greatest possible saving results from the efficient insulation of the crown, walls, ports and bottom of the tank, and particularly so is it true of the crown. Insulation of the regenerators will effect little or no saving in heat unless the regenerators are not primarily efficient.

Over 50 per cent of the heat from the fuel burned is ordinarily lost from radiation of the tank, and of this 50 per cent, the loss from the crown alone is almost half. Of course, it is understood that heat loss depends largely upon the difference between the outer temperature of the block or brick and that of the atmosphere. Although the heat loss is commonly termed "radiation," the greatest loss results from the formation of convection currents.

Ordinarily a tank is operated at about 2500° F. When tanks are of usual construction, the temperature of the surface of the crown over the melting section is between 550° and 650° F.; that of the ports is about 450° F.; and at the top of the regenerators the temperature is about 250° F.; the walls between the ports about 325° and at the bottom about 200°.

It can readily be seen from the foregoing that proper insulation is a highly important factor from the standpoint of economy, although rarely does one find that the operators of glass tanks give the subject as much consideration as they admit it deserves. As these articles proceed, further comment will be made regarding this subject of insulation, as it applies to the various lines of glass manufacture.

General

The writer believes that in the articles to come it will perhaps be of interest to describe various phases of manufacture, such as window glass, bottles—such as prescription ware, milk bottles, carboys, etc., table ware, hardware, etc., touching upon certain phases of the business which have not been brought out in the foregoing discussion.

NEW BRANCH OFFICES FOR CLOW GASTEAM ORGANIZATION

James B. Clow & Sons have opened new branches for the distribution of Clow Gasteam Radiators at El Paso, Texas, and Phoenix, Arizona. W. E. Boyd, formerly with the Texas Cities Gas Company, will be branch manager at El Paso, and Dale Shreeve at Phoenix.

Recent changes in the Gasteam organization sent H. O. Dummett to Kansas City as manager, and made J. Isaac, Jr., Houston, Texas, manager.

There are now 32 branch offices in the Clow Gasteam Heating Company, and 10 exclusive distributor offices. An office at Sydney, Australia, is now in its third year. Stocks are carried at all of these 43 distributing points.

Natural Gas Department Announces New Orleans Program Details

FINAL program details for the Convention of the A. G. A. Natural Gas Department, to be held at New Orleans, La., May 6, 7 and 8, are being whipped into shape. The tentative program, as given out by E. J. Stephany, secretary, is as follows:

Tuesday, May 6

9:30 a.m.

Invocation—Reverend Father P. M. H. Wynhoven, Gretna, La.

Address of Welcome—Mayor T. Semmes Walmsley, New Orleans, La.

Address of the Chairman—H. C. Morris, Dallas Gas Co., Dallas, Texas.

"Natural Gas, America's Newest Giant"—B. J. Mullaney, Peoples Gas Light and Coke Co., Chicago, Ill.

Address—Alexander Forward, American Gas Association, New York City, N. Y.

"Conservation in Louisiana"—Dr. J. A. Shaw, Department of Conservation, Shreveport, La.

Wrinkles—H. J. Hoover, Cincinnati, Ohio.

"Collecting Natural Gas Statistics"—R. W. Gallagher, East Ohio Gas Co., Cleveland.

Tuesday, May 6

1:30 p.m.

"Natural Gas Fellowships"—J. B. Tonkin, Peoples Natural Gas Co., Pittsburgh, Pa.

"Natural Gas Developments on the Pacific Coast"—W. S. Yard, Pacific Gas and Electric Co., San Francisco, Calif.

"Our Main Technical and Research Committee"—H. C. Cooper, Hope Natural Gas Co., Pittsburgh, Pa.

"Gas Measurement"—T. R. Weymouth, Oklahoma Natural Gas Corp., Tulsa.

"Pipe Line Flow"—H. D. Hancock, Henry L. Doherty and Co., New York City, N. Y.

"Gas Well Delivery Capacities"—N. C. McGowen, Louisiana Gas and Fuel Co., Shreveport, La.

"Leak Detection and Prevention in Congested Cities"—Dr. J. B. Garner, Peoples Natural Gas Co., Pittsburgh, Pa.

Wednesday, May 7

9:30 a.m.

"Building Domestic Sales"—W. J. MacIntyre, Southern Cities Distributing Co., Shreveport, La.

"Commercial Sales"—F. M .Rosenkrans, Gas Service Co., Kansas City, Mo.

"Home Service"—Miss A. Berry, San Antonio Public Service Co., San Antonio, Texas.

"Activities of a Public Relations and Advertising Department"—R. E. Haas, Columbia Gas and Electric Corp., New York City, N. Y.

"Pipe Protection"—George Wehrle, Public Service Company of Colorado, Denver.

1:30 p.m.

Open Forum

J. D. Creveling, Henry L. Doherty and Company, New York City, N. Y., will preside. The following subjects, and others, will be open for general discussion:

1. "Handling Water in Wells"—Discussion leader, J. H. Dunn, Lone Star Gas Co., Dallas, Texas.

2. "Recent Progress in the Saturation of Natural Gas with Oil and/or Water"—Discussion leader, H. L. Gaidry, New Orleans Public Service, Inc., New Orleans, La.

3. "The Relative Advantages of Displacement and Orifice Meters"—Discussion leader, George B. Sheppard, United Gas Co., Houston, Texas.

4. "How to Build Up Load in Southern Climates with a Large Percentage of Colored or Foreign Population"—Discussion leader, L. E. Vogelsang, San Antonio Public Service Co., San Antonio, Texas.

5. "Selling Gas for Househeating with Straight Gas and Conversion Units"—Discussion leader, J. J. Brennan, Memphis Power and Light Co., Memphis, Tenn.

Thursday, May 8

9:30 a.m.

"A Uniform Classification of Accounts"—E. N. Watkins, Arkansas Natural Gas Corp., Shreveport, La.

"Application of Degree Day Deficiency to Computing Domestic and Heating Loads"—R. M. Redding, Dallas Gas Co., Dallas, Texas.

"Gas Field Studies"—E. L. Rawlins, U. S. Bureau of Mines, Bartlesville, Okla.

"Development of Larger Industrial Sales"—W. M. Little, Cities Service Gas Co., Bartlesville, Okla.

Main Technical and Research Committee Meeting—Monday, May 5, at 10:30 a.m.

Meeting of Managing and Advisory Committees—Monday, May 5, at 5:30 p.m.

General Entertainments — Monday and Wednesday.

Ladies' Entertainments—Monday, Tuesday and Wednesday.

SEATTLE GAS COMPANY IS NEW NAME OF SEATTLE LIGHTING

James F. Pollard

At a meeting of the stockholders of Seattle Lighting Company, held on March 28, the name of the company was changed to Seattle Gas Company. James F. Pollard will continue as general manager of the organization.

Announcement was recently made that W. H. White and Joshua Green, both of Seattle, Wash., have been elected to the board of directors of the company. Mr. White is vice-president of the firm of Drumheller, Ehrlichman & White, investment bankers of Seattle. Mr. Green is chairman of the board of the Peoples Bank & Trust Company.

With *the* Metermen

Metermen Hold March 20 Session *at* Oil Equipment Exposition

MEETING at the Shrine Auditorium in Los Angeles in connection with the Oil Equipment and Engineering Exposition, some 200 members and friends of the Southern California Meter Association were present on March 20 to inspect the many exhibits comprising the Exposition, which this year was conducted for the first time. Dinner was served in Exposition style to 150 S.C.M.A. men in one of the Shrine Auditorium banquet halls, following which the business program of the organization was held.

President R. F. Angell opened the sessions, introducing several visitors. R. E. Beckley, president of the California Natural Gasoline Association, brought the greetings and good wishes of that organization to the meeting, expressing the hope that both organizations might co-operate effectively in their respective fields. Earle Derby, manager of the Standard Gasoline Company, was also present and commented briefly upon the accomplishments of the meter group, conveying the best wishes of his company for continued success in the Association program. A. F. Bridge, vice-president of the Southern Counties Gas Company, was introduced and remarked upon the Association's field of service in improving measurement practice.

Speakers of the evening were introduced by Ralph Cook, chairman of the program committee. F. A. Hough of the Southern Counties Gas Company presented the first paper, on the topic of "Uses for Liquefied Petroleum Gas in the Gas Industry." This comprehensive review of economic and other factors involved in service of liquefied petroleum gas will appear in *Western Gas* for May, 1930.

Next was a paper by Guy Corfield, of the Los Angeles Gas and Electric Corporation, on "Natural Gas Odorization in Southern California." A complete discussion of this subject, prepared in collaboration by Mr. Corfield and F. A. Hough, and covering the substance of Mr. Corfield's paper, appeared in *Western Gas* for March, 1930.

Concluding the program of papers and discussions was the paper read by C. L. Parkhill, of the J. A. Campbell Company, on "The Problem of Mist Elimination." This paper, which was accompanied by slides, appears in this issue. It was prepared by Mr. Campbell, who, due to illness, was unable to be present.

Considerable credit is due M. R. Miller and his program committee for making the necessary arrangements upon short notice to hold the March meeting at the Oil Equipment and Engineering Exposition.

Dates for the Exposition were March 16-23. Its reception was so cordial that plans are now announced for construction of permanent buildings, with the Exposition feature to be held annually, and the permanent buildings to be kept open for all-year-round service to buyers of equipment for oil and gas industries. Acreage near the center of Los Angeles' manufacturing district has been selected already, according to E. G. Lenzner, managing director of the Exposition, and the buildings should be open for occupancy early in July. Display space will be all on the same floor to facilitate installation of heavy machinery, and arrangements will be made for display of large equipment, such as derricks, outside the buildings. Conference rooms will be available for exhibitors and buyers.

Dates for the Second Annual Pacific Coast Oil and Equipment Exposition are given as March 15-22, 1931, the display to be housed in its own plant.

Over 100 Receive First Extension Lessons

ELEVEN states and one Canadian province are already represented in the Southern California Meter Association extension correspondence course in gas measurement. The first lesson sets were distributed early last month to more than 100 individuals, from several score companies, already enrolled. Announcement was made late in March from Association headquarters that second lesson sets are ready for the mails, and those who intend to enroll but have not done so are urged to complete their arrangements speedily in order to receive the benefit of initial prices. A limited number of courses have been prepared for distribution at the prices first announced ($18.00 to non-members and $17.00 to members, payable in advance or payable $8.00 at enrollment and balance in two equal monthly installments.) Enrollments should be mailed to the following address: Southern California Meter Association, attention L. L. Sutherland, 810 South Flower street, Box 1100-Station C., Los Angeles, Calif.

It is evident from the lessons already distributed that the S. C. M. A. course will prove of highly practical value to everyone interested in gas flow and gas measurement. Among other features, it explains many short cuts and simplifications in gas computation. The personal attention of Professor L. L. Sutherland, who is directing the course for the Association, is available to everyone enrolling, making the course adaptable to everyone's needs.

Lessons No. 1 and No. 2 both contain interesting lectures by Professor Sutherland, and also by H. E. Thompson, measurement engineer, with the Los Angeles Gas and Electric Corporation. Each installment of the 20 comprising the course will contain a lecture contributed by a measurement engineer from the Association membership. Individuals from various gas and oil companies are contributing these lectures, making a wide range of experience available to those taking the course. Besides the lectures the lessons proper are prepared in a very readable style, and a number of problems accompany each one.

THOMPSON COMBUSTION ENGINEER AT L. A. G. AND E. PLANTS

H. E. Thompson, a charter member of the Southern California Meter Association and formerly assistant chemist at the Seal Beach plant of the Los Angeles Gas and Electric Corporation, has been appointed to the position of combustion engineer of both Seal Beach, and Alameda Street (Los Angeles), power generating stations of the L. A. Gas and Electric.

G. H. BRIGGS TAKES POSITION WITH PAC. GAS AND ELECTRIC

George H. Briggs, formerly laboratory assistant at the Seal Beach Power Station of the Los Angeles Gas and Electric Corporation has accepted a position with the Pacific Gas and Electric Company at San Francisco in connection with the design and erection of a modern power plant in which boiler pressures will be 1200 pounds to the square inch.

R. G. BRAY GOES TO OLEUM AS TECHNICAL ASSISTANT

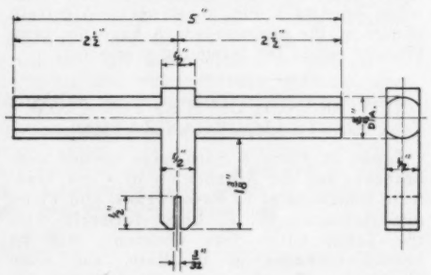
R. G. Bray has been made technical assistant with the Union Oil Company of California, and is now located at the Union Refinery at Oleum, Calif.

This "Gadget" Simplifies Float Leveling

Submitted by E. LORENZ

Southern California Gas Company

THIS instrument lays across the top of the mercury pot, and a slot fits the float lever. This is made perfectly square and truly centered. If the float is level the instrument will set directly on top



of the mercury pot. If the float is off of true level, it will not.

The device, which is shown in diagram above, was designed and made by E. F. Ruppert of the Southern California Gas Company. It received honorable mention in the first "gadget" contest sponsored by the Southern California Meter Association. The diagram above shows the instrument in slightly less than one-third actual size.

The Problem *of* Mist Elimination

By J. A. CAMPBELL
*J. A. Campbell Company**

THE elimination of crude mist from natural gas is being given more attention today than ever before. There are several factors responsible for this interest. In the first place, in line with the policy of conservation, the oil industry, is putting its research men to work on all sorts of problems affecting the efficiency of its operations. By-products that have in the past been wasted are now sold at a profit, operating costs have been reduced, inefficient equipment is being replaced by the best that engineering skill and experience can produce.

This is the day of spud and speed, and speed in the oil industry calls for higher velocities and larger quantities. Ten years ago a 10,000,000-cubic-foot gasoline plant was considered large, and a well making 1,000,000 cubic feet of gas was regarded as a big producer. Today we have gasoline plants handling 100,000,000 cubic feet of gas, and that quantity all from a single well. In the old days the gas-gathering lines entering a gasoline plant ran through an old discarded boiler, on the assumption that the reduction in velocity would serve to drop out any oil that the gas carried. If it did not, there was no good way of checking up. Some of the plants used crude as an absorbing medium and others used any old slop oil that happened to be handy. Almost any oil served, from a brown neutral lube stock to steam still bottoms.

Today things are entirely different. The gas engineer, instead of taking what the refinery has to offer in the way of an absorption oil, gives the refiner his specifications and, as a result, gets a refined oil, usually light in color, which is suited to the absorption of the particular fractions contained in the gas, as determined by fractionation.

After he gets this oil into his plant, the gas engineer is confronted with the problem of maintaining it in the proper condition to insure maximum absorptive efficiency. This is a problem that, of late, has become quite serious. The deeper sands developed in recent years are more prolific. Greater gas-to-oil ratios are encountered, and gas velocities through the field traps are so high that considerable quantities of crude oil in the form of mist are finding their way into the gasoline plants. If this mist is not removed from the gas flow before reaching the absorbers, it contaminates the absorption oil, impairs its absorptive efficiency, increases its viscosity, and lowers its thermal conductivity. Most natural gas also carries a considerable amount of foreign matter in the form of finely divided formation, rotary mud, pipe scale and dust. The asphaltic fractions of the crude form an excellent binder for these, and soon the tubes of the heat-exchanger and pre-heater become coated with this material, which, because of its nature, functions as an active insulator.

Another problem presents itself where the gas leaves the absorber. Due to the improved design of today, high gas velocities through the absorbers are prevalent. If the absorption oil becomes contaminated with crude, this mist will contain asphaltic fractions which gum up regulators, carbonize in the mixing valves of gas engines, and plug up gas burners, to say nothing of smudging up the pots and pans of her ladyship, the housewife.

Even though the oil in the absorber is free from crude, the intimate contact between the gas and the oil in any modern absorber results in the atomization and loss, by way of the outlet gas line, of a considerable quantity of absorption oil. This means trouble for the meterman and for the drip tender, aside from the loss of oil.

In the past, various types of separators have been used on gas lines. Some of these, being quite large, reduced the line velocity considerably. Others were of the centrifugal type, having a tangential inlet with the outlet passing through the center of the upper head and extending down into the body of the scrubber to a point possibly a foot below the tangential inlet. In theory, the entrained liquid followed around the inside of the shell and dropped down, while the gas flowed out the center pipe. In practice, the liquid did just that. But the gas, having a certain amount of inertia, also was thrown along the curved shell by centrifugal force, coming in intimate contact with the liquid film and atomizing it. The mist particles were so thoroughly diffused into the gas that they were swept out with it, and it is questionable if better results would not have been obtained had the gas inlet been put in the head alongside of the outlet so that the gas stream would have been directed downward.

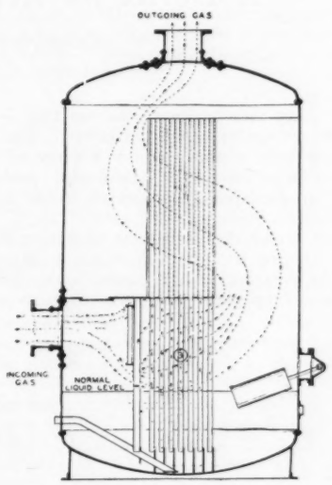


Fig. 1

Recently various types of baffling have been designed for the purpose of catching and trapping the liquid carried in gas. Some of these work very well at certain velocities, but at greater or lower velocities their efficiency drops off. After considerable work with various types of baffling, the writer decided to make a study of the action of gas carrying liquid on baffles of various forms, in an effort to determine why fairly good results would be obtained at a certain gas rate and, for slightly increased rate, very poor separation be effected. Models were made, and from these it was determined that for a given design of baffling and spacing a certain velocity would give what we might call a stream-line flow through the baffling with the gas streams striking the baffle surface properly, and at the right angle to throw out its mist particles and allow them to run down the baffles. Fairly good results were obtained over a very narrow range. By increasing or decreasing the velocity, turbulence was set up and gas eddies formed, which swept the film off the baffles and back into the path of the gas.

All kinds of baffles have been tried with catch-pockets and protected slots; but all have the same failing, in that the eddies seemed to be able to whip the liquid film out of them and throw it back into the path of the gas. From a study of these baffles it was evident that a smooth baffle was not suited to the collecting and holding of the liquid film, so the problem resolved itself into two essentials. First, to find a surface conducive to the agglomeration of mist particles; and, second, to quickly remove the agglomerated particles from this surface and get them entirely out of the path of the gas. This at first seemed a pretty weighty problem, but it was very simply and effectively solved by the expedient of setting a sheet of screen wire slightly away from the steel baffles. The next thing was to adopt some form of steel baffle, so we went back to one developed several years ago in our first experiments.

By the work done with various types of baffling it became evident that another feature necessary, in a satisfactory separator, must be a device for getting the liquid entirely out of contact with the gas, and not merely down at the bottom of the chamber through which the gas is flowing.

This was taken care of by running dams across the baffle rows at their bottoms and running tubes from the reservoirs thus created through the bottom diaphram, extending them below the liquid level in the base.

Fig. 1 shows the apparatus which was finally developed and put on the market under the name of Mist-D-Fier, this illustration presenting an elevation looking endwise at the baffle nest.

The shell consists of a vertical steel cylinder with bumped heads and with welded or riveted seams. The bottom head has a supporting skirt and flange, which rest on a foundation. The gas enters at the inlet nozzle, and impinges on the heavy hardwood baffle, which tends to throw out any heavy slugs of oil or water. The gas next passes around the end of the diaphram plate, making approximately a 180° turn. The gas thus enters the baffle box, where it passes through rows of vertical steel baffles and finally leaves the apparatus through the nozzle. Liquid caught by the baffles drains down to the

*Presented before the Southern California Meter Association, March 20, 1930. Read by C. L. Parkhill of the J. A. Campbell Company.

bottom of the lower chamber through the tubes, the lower ends of which are below the level of the liquid accumulated in the base.

Accumulated liquid is drawn off from the base through the connection, which ordinarily is fitted with a balanced valve operated automatically by the float. A pressure drain is provided for completely draining the chamber. Gauge-glass connections are provided so that the liquid level may be observed.

The scrubbing action of the baffle section is illustrated in detail in Fig. 2. This section is made up of a number of rows, usually 14, of vertical pressed steel baffles with raised beads (2) running lengthwise, rolled

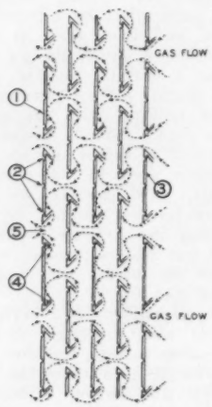


Fig. 2 Horizontal section of baffle

into the flat surface, and the edges turned back 135°. The front face of each baffle is covered with a double sheet of screen wire (3), which is supported about 1/8 inch out from the metal by being riveted to the beads. The baffles are spaced and staggered, as indicated in Fig. 2, so as to form long vertical slots between the edges for the passage of the gas. Due to this arrangement, the gas is forced to follow a tortuous path, reversing its direction of flow twice for each row of baffles.

These reversals of flow tend to throw the larger droplets of liquid out of the gas stream by centrifugal force, causing them to agglomerate and run down the screens in the form of films. Moreover, because of the extremely turbulent flow, every particle of the gas sooner or later comes in contact with the very large wet surface, thus presented. In this way, the finest particles of suspended liquid are absorbed or agglomerated on these surfaces.

Due to the impact of the gas, the films trickle down on the backside of the screen in a comparatively undisturbed passage, protected on the back by the solid baffle, and in front by the screen. Thus, there is little chance of the liquid being whipped back into the gas stream.

Light angles along each row of baffles at the bottom serve the double purpose of fastening them to the bottom plate and of preventing the liquid from traveling along the bottom of the baffle box.

Some very interesting characteristics have been brought out in tests run on a true-scale glassed-in model of the Mist-D-Fier. This model, which has a capacity of 70,000 cubic feet per day, has an oil-injection chamber and drains of sufficient size that the oil may be injected at the rate of 700 gallons per day; in other words, 10 gallons of oil per 1,000 cubic feet of gas. At these rates no oil passes the last four rows of baffles, and none can be detected on a sheet of white paper held over the gas outlet. To make the test as severe as possible, we used a deep purple dye in the oil. Notwithstanding, the paper, after being repeatedly passed over the gas outlet, retained its immaculate whiteness. The model, after being subjected to this extreme rate, was operated at a varying range extending down to the very lowest, incidentally calling for different rates of gas flow and oil injection—all with equally good results.

This performance has been checked in a test recently conducted on a Mist-D-Fier rated at 10 million cubic feet per day. No difference in efficiency was noted over a range extending from 4,000,000 to 17,000,000 cubic feet. Higher and lower rates could not be tried out conviently.

There are many applications to which the Mist-D-Fier principle will be adapted. In addition to serving as a gas trap in the field, it has successfully been used as a gas silencer. The systematic changes of direction, causing the gas to split two ways at each baffle and thus come together again, effectively break up the sound nodes. In a simplified form it has proved very effective as a gas-engine muffler. When used as a steam separator on exhaust steam it thoroughly strips it of any lubricating oil it may carry.

It is finding wide use at gasoline plants in flush fields, where it is throwing out large quantities of crude and, at the same time, protecting the absorption oil. One installation salvaged over 7000 barrels of oil within a period of one month. In a certain plant a trap stuck one night. The Mist-D-Fier on the job began throwing out crude as fast as the operator could pump it out through a 3-inch line. Yet the crude never reached the absorbers.

Another installation protects the engines of one of the large fuel companies, by throwing out the oil from the fuel.

To the gas meterman the Mist-D-Fier makes an appeal in the fact that it keeps his plates clean, keeps liquid out of his meter runs, and so out of his instruments. It cuts down line surging and minimizes pulsations. In addition, it makes regulators work more smoothly, and lengthens the life of diaphragms.

A Device *for* Removing Center Bearings

Submitted by M. E. CARRICO
Southern California Gas Company

IN using this "gadget" the top bolt is anchored under large top cover. The bottom bolt is anchored by a piece of iron resting against 2-inch stand-pipe and the body of gage holding special screw driver in position.

Concerning the usefulness of his "gadget" Mr. Carrico has the following to say:

"The bearing either comes loose, or the screw driver point will break. I have removed some bearings that were stuck very tight. I have also broken the point to the screw driver and had to send the gage to the shop to have the bearing drilled out."

Honorable mention was awarded this "gadget" in the contest recently concluded by the Southern California Meter Association "Gadget Club." The diagram here published shows details for constructing the center bearing puller.

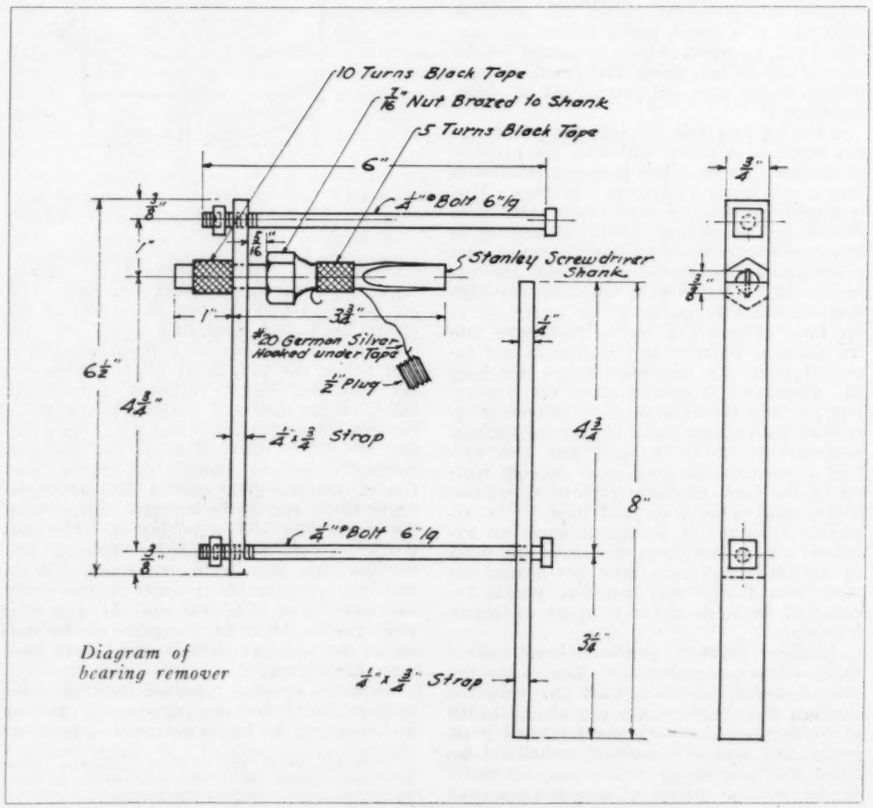


Diagram of bearing remover

Death Takes Leon P. Lowe, Oil Gas Inventor

LEON P. LOWE, who during his lifetime exercised a profound influence upon the gas industry, particularly that of the West, passed away in the Good Samaritan Hospital, Los Angeles, on March 17 after a six-month illness.

Son of the late Prof. Thaddeus S. C. Lowe, inventor of the carburetted water gas process, Leon P. Lowe, while working on his father's patents himself conceived and developed the oil gas process and secured patents on it in 1889. He was a resident of Lynn, Mass., at that time.

Mr. Lowe, who was 69 years of age at his death, was born in New York, but came west in the '80's and lived most of his life in San Francisco. On the way to the west coast he constructed and operated one of the original oil gas plants, at Colorado Springs, Colo.

Credit is due Mr. Lowe not only for inventing the oil gas process, but for actively pioneering its application at numerous points in the West. Late in the '90's he organized the California Light and Fuel Company, which designed, built and operated oil gas plants. He erected the first oil gas plant in California, which brought gas to Pasadena, in 1899; in 1902 he built the Oakland gas works, the first to supply a large metropolitan center with oil gas; he assisted in promoting the Honolulu Gas Company, and supplied oil and gas equipment for it. He installed plants in a great many communities of California and Nevada.

Oil gas brought to the west coast industry the same kind of stimulus that is supplied by natural gas today. When the California Central Gas and Electric Company consolidated with other interests to form the present Pacific Gas and Electric Company, the oil gas process was introduced widely in northern California, and Mr. Lowe disposed of his patents on it to the P. G. and E.

During his active years Mr. Lowe was intensely interested in the advancement of the industry in the West. He served the Pacific Coast Gas Association as president in 1905, and always gave liberally of his time and effort to its support. Among other services, he presented the organization with its library furnishings.

Friends of Mr. Lowe will remember him not alone for his contribution to the science of gas manufacture, but also for his artistic interests. He was a color photographer of considerable talent, and was a lifelong collector of art objects.

PORTLAND GAS AND COKE PLANS EXTENSIVE IMPROVEMENTS

Portland Gas and Coke Company, of Portland, Oregon, announced that the company's budget for expenditures in additions and improvements to property will amount to approximately $450,000 in 1930. There is a probability of an additional expenditure of $500,000 for the extension of gas service into territory outside of Portland.

Expenditures decided upon to provide extensions of service in the Willamette Valley to communities which can be reached from the main line between Portland and Salem amount to $125,000.

Services for new customers will require approximately $100,000. About $60,000 will be spent to complete mains and services under construction in the Salem district in 1929. Miscellaneous line extensions will necessitate an expenditure of about $55,000.

Gas Display *at* Dodge City Exposition

ARGUS Gas & Fuel Co., of Dodge City, Kansas, had an interesting display at the Southwest Kansas Tractor & Implement Show at Dodge City during the first week in March. One feature of interest was the complete miniature oil derricks, one drilling, the other pumping oil, together with houses and equipment which accompany the derricks in the field.

Another feature—a tea kettle in the window with a burner suspended beneath it, burning natural gas without visible connection to a main—attracted a great deal of attention during the show.

UNITED GAS CO. TO MERGE WITH ELECTRIC BOND & SHARE

A MERGER of the United Gas Company interests of Houston with important properties of the Electric Bond & Share Company interests is being brought to consummation, according to New York press reports, thereby creating one of the largest natural gas companies in the United States.

The merger will join under one holding company the United Gas Company of Houston, the Louisiana Gas & Fuel, largely owned by the Electric Power and Light Company, affiliated with the Electric Bond & Share Company; the Magnolia Gas Company, a subsidiary of the Standard Oil Company of New York; the Northern Texas Utilities, and the Consolidated Gas Utilities. Properties estimated at more than $1,000,000,000 will be involved in the merger.

O. R. Seagraves of Houston, president of the United Gas Company, E. G. Dieffbach, president of G. E. Barrett & Company, and Sidney Mitchell, of the Electric Bond & Share, are prominently associated with the merger, and either Mr. Seagraves or Mr. Mitchell will be named chairman of the board of the new company, according to report.

Upon completion of the plans for the merger, the new company will operate more than 10,000 miles of pipe lines and will hold gas reserves on more than 1,000,000 acres.

NEBRASKA DISTRIBUTING CO. HAS OFFICIAL OPENING AT FALLS CITY

Official opening of the offices of the Nebraska Distributing Company at Falls City, Nebraska, was held Thursday, March 6. Gas toasters were given away to all of the women attending. Leslie M. King and W. K. Morsman are new business representatives of the company, a Cities Service subsidiary, at Falls City.

NEW COMPRESSOR STATION FOR COLORADO INTERSTATE GAS CO.

A compressor station is being constructed by the Colorado Interstate Gas Company at a point on its Texas to Colorado gas line seven miles east of Clayton, New Mexico, mid-way between the Bivens Station, 30 miles from Amarillo, and the Picketwire Canyon station in Colorado. B. R. Wilson is contracting superintendent for the company.

Three 1,000 h.p. Worthington twin tandem double acting engine compressors will be installed, and the station complete will cost about $500,000. Construction is expected to be finished and the station ready for operation about the first of October.

A similar station being constructed near Devine, Colorado, will have two 1,000 h.p. Worthington compressors. This station will be ready for operation about the first of November.

MOODY-SEAGRAVES INTERESTS PURCHASE MORGAN HOLDINGS

Moody-Seagraves interests have completed arrangements for the purchase of the holdings of the W. F. Morgan interests in the Refugio field. The purchase price for the properties, which included 2500 acres in the field, was stated at $3,500,000.

Prior to the purchase Moody-Seagraves already controlled the greatest acreage in the field. Houston Gulf Gas Company takes the gas production from the area, and the Union Producing Company the oil.

WASHINGTON GAS & ELEC. CO. ASKS HOQUIAM FRANCHISE

Washington Gas & Electric Company, with headquarters at Tacoma, Washington, has applied to the city of Hoquiam for a 50-year franchise to supply gas to that town.

SALES WRINKLES

"He Gains Wisdom in a Happy Way Who Gains it by Another's Experience"... PLAUTUS

Wanted—Practical Sales Ideas—at $10 Each

THIS SALES WRINKLE department is an open forum for sales ideas which are working out in a practical way for gas appliance salesmen, company new business departments, and gas appliance retailers. Payment is made at the rate of $10 for each idea published.

Wrinkles this month present: The Society Page as a source for leads—One company's price tag system.—A complete procedure for building a permanent clientele out of past customers.

And those accepting $10 checks for the above ideas are:

Leonard R. H. Hardie, Southern Counties Gas Company, San Pedro, Calif.

Paul A. Carnahan, Western Utilities Stores Company, Salina, Kansas.

A. W. Young, Pacific Gas and Electric Company, Oakland, Calif.

YOUR wrinkle, sent to "Western Gas" at publication offices, 124 West Fourth Street, Los Angeles, Calif., will bring you $10 promptly upon its publication.

Society Page Makes Choice Reading for Salesman

BY systematic and careful observation of the society page of the local newspaper, many excellent leads can be obtained, which, when properly contacted and sold by the gas appliance salesman who is alive to the possibilities, will result in very desirable "group" sales.

Every day of the week there is published the report of the meeting of the So-and-So

Card Club, or the Such-and-Such Sewing Club, and there follows a list of the members present. Now it behooves the alert salesman to find out just who are the *leaders* of these various clubs, (for there is sure to be a leading spirit in every such gathering), and, further, to thoroughly sell the leaders some needed appliance and gain their complete confidence.

It is reasonable to suppose that Mrs. Customer, being happy in the possession of, we will say, a new gas-fired refrigerator, and entertaining her intimate friends once or twice a month, will so praise and boost the appliance as to start the ball of emulation rolling, thereby making it easy for the salesman to contact and sell a group of similar appliances—in proportion to his ingenuity and ability.

In some cases the good work is carried farther afield by a customer who belongs to more than one club. It pays to keep a discerning eye on the *Society Page!*

—Leonard R. H. Hardie.

A Clientele for Every Profession

A TRULY successful salesman will endeavor to create a following, or clientele, similar to that of a professional man. This ever-growing coterie will soon bring him or send him business from wholly unexpected places. The secret of creating a cumulative group of well pleased and reciprocating customers starts with the very first sale the salesman makes. The following simple machinery will do wonders in establishing yourself in the buying consciousness of your customers:

1. After every sale, send a thank-you letter. Express your wish to render a completely satisfactory service and assure the customer that the merchandise purchased will give years of continuous and dependable utility—for such is your aim and purpose in building good-will.

2. Shortly after the installation send a post-card, with a reply half, inquiring if everything is satisfactory, if statements made are being realized, and inviting any complaint or criticism of the appliance, your methods, or your promises. If everything is "okay," suggest that a comment would be appreciated.

3. Make a personal call-back in 30 to 60 days. At this time leave the customer two or three self-addressed cards bearing your name and company address, and carrying a printed summons for you to call, in case any service is required or trouble develops.

4. Watch the account, if it is on an installment basis, and when the last payment is made, write a personal letter recalling the pleasant experiences and agreeable circumstances of the sale, the fact that the company has profited by having the name on its books and stands ready to extend its entire facilities of sales and credit on any immediate or future transaction.

Telephone the customer at an opportune time, reminding him that even though his account is closed, the company has not forgotten the transaction, and is constantly on call for any exigency which may arise in the customer's use of its service.

—A. W. Young.

Getting the Most Out of the Price Tag

PRICE tags are small articles, but they have a place in the sales scheme and should be properly designed to serve their purpose. Everyone entering a store instinctively looks for prices. If the shopper is merely curious the price tag may clinch his interest, and a sale later develop. And if the shopper is definitely in the market for an appliance, there is even more reason that the price tag should provide him the information he is seeking.

The Western Utilities Stores Company, Salina, Kansas, has developed a uniform price tag which carries more than the usual information to the prospective buyer, and which also facilitates appliance stock record procedure. A letter from Mr. Carnahan, vice-president of the Company, gives "Sales Wrinkles" readers the following description of the tag:

"We are sending a copy of our store price tag, which we have adopted as a uniform pricing system, in both our gas and electric merchandising stores. You will notice, from this price tag, that sufficient space is provided to show both the deferred payment,

Price tag in use by Western Utilities Stores Company.

and the cash price, as well as the payments, stock or model number of the item, and a quotation of the cost in code letters. There is also sufficient space provided on the reverse side of this card to provide a stock record system.

"Our company's idea in adopting this price tag was to eliminate any possible question on the part of the purchasing public, regarding any differential which we made between time payment and cash prices on the merchandise. Whenever a special campaign is run, when the prices are not the regular standard prices, a special price tag is provided, which goes on the same string with the regular price tag. This makes it possible for the customer to determine for himself the difference between the regular price and the special campaign price during the period".

—Paul A. Carnahan.

COAST COUNTIES HOLDS ANNUAL SALES CONFERENCE IN MARCH

The annual "Sales Get-together" of the Coast Counties Gas and Electric Company was held in March in Santa Cruz with 100 in attendance. Besides the regular sales organizations, district managers and office forces from the territory served by the company were present.

J. B. Wilson, president of the Coast Counties Company was the speaker of the evening. Pierre Vinet, new business manager, arranged all details for the dinner, and outlined the progress made by his department during the past year, in addition to outlining plans for 1930.

The importance of employee cooperation in advertising was presented by W. M. Hines, advertising manager, and R. B. F. Chisholm, auditor, spoke on "Credit." Miss Alma Freeburg, president of the Women's Committee, talked on the part women play in the business world today.

D. M. WALLINGTON TO HEAD NEW MERCHANDISING DEPT.

D. M. Wallington has been placed in charge of the merchandising department recently organized by the Public Utilities Corporation of Arkansas, operating as a subsidiary of the Arkansas Natural Gas Corporation, at Conway. F. M. Burns is house heating engineer in the Conway district.

Similar departments are being opened in seven other Arkansas cities, under the direction of S. A. Lipscombe of Little Rock, commercial manager of the Arkansas Natural properties.

DOROTHY CLOCK TO MANAGE NEW DEPT. FOR K. C. GAS CO.

Miss Dorothy G. Clock has been named to take charge of the newly formed Home Service Department of the Kansas City Gas Company of Kansas City, Mo. Miss Clock comes to her new post from the Atlantic Gas Company of Philadelphia, Pa., where she has directed the activities of the Home Economics Department. She received her education at the Iowa State University at Ames, and at Columbia University, New York.

SO. COUNTIES SALES TOTAL $3,000 FOR TWO MONTHS

Sales of Southern Counties Gas Company of Los Angeles, California, increased by more than $3,000 for the first two months of 1930, as compared with the same period in 1929, according to an announcement made by Clyde H. Potter, general commercial agent, at the monthly sales dinner of the company held on March 12.

Group of Stamford & Western Gas Company representatives. Left to right, rear row: Ernest Wells, district manager; Louis Jolley, salesman; Jack Roe, fitter; Roy Ratliff, salesman; Olen Patterson, fitter. Front row: W. J. Buie, sales supervisor; Roy Duke, salesman; J. Leo Jolley, general manager; W. M. Braymer, district manager; Armon Cooper, general superintendent.

A Gas Heater Premium Campaign

By W. J. Buie

Sales Supervisor, Stamford & Western Gas Company

THE plan of giving a piece of merchandise free with the purchase of another piece of merchandise was tried out by the Stamford & Western Gas Company recently when the company conducted a selling campaign on gas ranges and water heaters. To every purchaser of a gas range or water heater a gas heater was given free. The value of the heaters ranged from $12.50 to $69, depending upon the value of the range or water heater sold.

The campaign, with its free heater feature, was given wide publicity through the papers, direct-by-mail and through personal calls. To create enthusiasm and competition among the company employees the sales force was divided into two groups. W. J. Buie, sales supervisor, was placed in charge of Group Number 1 and A. B. Cooper, general superintendent, piloted Group Number 2.

To further create interest and afford a goal to be fought for, the company offered as a grand prize a banquet to the winning team at which they would be honor guests. As an additional incentive to the team captains the general manager, J. Leo Jolley, offered $10 in gold to the captain of the team leading at the close of the first 10 days of the contest, and an additional $10 in gold to the captain who nosed out ahead during the last 10 days of the selling period.

Winners were determined on a meter percentage basis—that is, taking as a total all of the meters as 100 per cent, the meters in each territory were counted and the team captain of the territory given his per cent of the total. One captain had 58 per cent of the meters, and the other had the remaining 42 per cent. To determine the winner the sales of each group were multiplied by the per cent of meters in the territory of each. The public responded favorably to the campaign and it was declared a financial success, with sales for the month averaging $3.75 per meter. Tangible results of the month's selling efforts were 89 ranges and 31 water heaters, four conversion jobs and other sales of minor importance. Forty new meters were also put on the line, which were credited directly to the efforts of the campaign.

Honors in the $10 gold awards were divided by the group leaders, Mr. Buie taking the money for the first 10-day period and Mr. Cooper being the high man of the closing 10. Grand honors for the sale were awarded to Team Number 1. A banquet in its honor was held at the Stamford Inn on January 4, at which the unusual items of bear and elk meat headed the bill of fare. These main items, that is, bear and elk meat, were furnished through the courtesy of the President, C. O. Moore. The banquet was followed by a dance and bridge at the Country Club.

The Stamford & Western Gas Company serves some 21 Texas communities, in eight of which offices are maintained. Each salesman worked in an individual district comprising several towns. Smaller towns were apportioned out equally among the salesmen, and about a day each week devoted to them during the campaign, which ran simultaneously throughout all of the company's territory.

Only one adverse comment has been made on the general scheme of the free heater campaign staged by the company. The plan was put into operation on the 25th day of November and was run for 30 days. It is believed that December is not the best month for such a project, and in 1930 we expect to repeat this selling campaign during October and November.

The personnel of the teams was as follows:

Group Number 1—W. J. Buie, Stamford; Roy Duke, Hamlin; William Braymer, Anson.

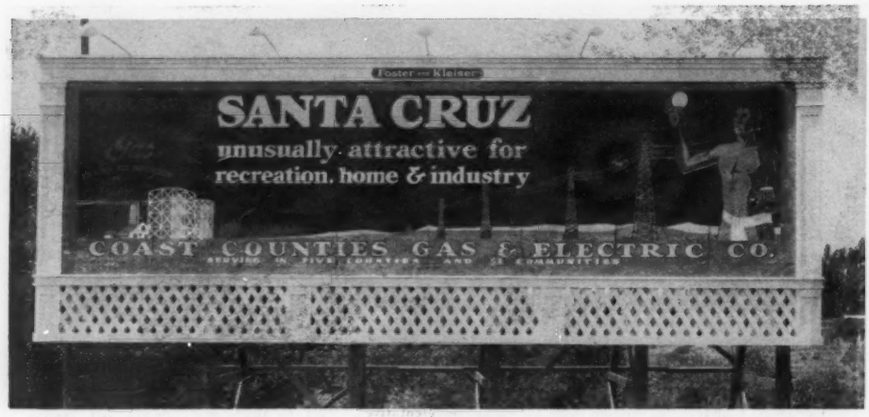
Group Number 2—A. B. Cooper, Stamford; Roy Ratliff, Haskell; Reid Wilson, Munday; Jas. A. White, Seymour.

McQUILLIN TO DIRECT NEW BUSINESS AT SABETHA

John F. McQuillin of the New Business Department of the Wyandotte County Gas Company of Kansas City, Kansas, has been transferred to Sabetha, where he will have charge of the New Business Department of the new gas company in that city. Both companies are Gas Service subsidiaries.

PORTLAND GAS AND COKE WANTS THREE FRANCHISES

Portland Gas and Coke Company of Portland, Oregon, has asked for a franchise for the service of gas to Gervais, Brooks, and South Salem, Oregon.



Company Billboards Boost Community Enterprise

By A. FREEBURG
Coast Counties Gas & Electric Company

WHEN the Santa Cruz Chamber of Commerce appointed an active industrial committee and began to make special effort to attract industries and home owners to the Santa Cruz, California, territory the Coast Counties Gas & Electric Company was prompt to tie in with this enterprise.

Coast Counties has erected two large signs on the main highways leading into Santa Cruz, calling the attention of the motoring public to the fact that they are entering Santa Cruz, a city of homes with many advantages to offer for industrial sites. As can be seen by the accompanying photographs, these boards were "Welcome to Santa Cruz" signs, with the name of the utility company of secondary importance. Yet prospective home and industrial site seekers, reading the boards, could not miss the message that excellent gas and electric service would also be available, should they desire to locate in Santa Cruz.

These boards have been maintained and illuminated by the Coast Counties Company at no expense to the community and have attracted considerable attention throughout the state, as well as encouraged other business men in Santa Cruz to greater activity in making Santa Cruz an all-year community.

With the advent of natural gas in their entire territory, Coast Counties is also planning to erect another board near Hollister and Gilroy to emphasize the fact that this super fuel is now available for both industrial and domestic consumers. Similar change will also be made in the Santa Cruz boards, to stress natural gas service.

To tie in with these boards, the Coast Counties also ran "Trade at Home" advertisements in the local papers of the communities of its service area, urging the residents to patronize merchants in their own home town.

Seventh Distribution Conference Program Announced

PROGRAM details have been announced by the Executive Committee for the Seventh Annual Conference of the Distribution Committee of the American Gas Association, to be held at the Statler Hotel in St. Louis, Mo., April 9, 10, and 11.

Six sessions will be held, with papers, followed by a full discussion of the many subjects listed on the program. In the field of distribution, members of both manufactured and natural gas divisions of the industry find many problems in common, and it was with the object of increasing the attendance of natural gas engineers that the Executive Committee decided to hold the conference in a mid-west city.

Following is the program for the sessions:

WEDNESDAY, APRIL 9, 1930

10:00 A.M.

Opening Remarks: J. H. Braine, Chairman, Distribution Committee.

Welcome to St. Louis.

Report of Committee on Distribution Design: C. S. Goldsmith, Brooklyn Union Gas Co., Brooklyn, N. Y.

Paper: Design of Distribution Buildings; Charles F. Morris, Public Service Co. of Colorado, Denver, Colorado.

Report of Cast Iron Pipe Standards Committee: Walton Forstall, Philadelphia Gas Works Company, Philadelphia, Pa.

2:00 P.M.

Report of Pipe Joints Committee: O. S. Hagerman, American Light & Traction Co., Chicago, Ill.

Paper: Cast Iron Pipe Joints Research at A.G.A. Laboratory: K. R. Knapp, A.G.A. Laboratory, Cleveland, Ohio.

Paper: Pipe Joints Research at U.G.I. Laboratory: H. W. Battin, United Gas Improvement Co., Philadelphia, Pa.

Paper: Unaccounted-for Gas: J. M. Pickford, Midland United Co., Chicago, Ill.

Report of Committee on Distribution Portable Equipment: Ralph Orme, Missouri Natural Gas Co., St. Louis, Missouri.

THURSDAY, APRIL 10, 1930

9:30 A.M.

Report of Meters Committee: W. H. Bettle, Public Service Electric & Gas Co., Newark, N. J.

Paper: Orifice Meters: D. A. Sillers, Lone Star Gas Co., Dallas, Texas.

Paper: Public Relations from the Distribution Engineer's Standpoint: Harry Ellis, Public Service Electric & Gas Co., Newark, N. J.

2:00 P.M.

Report of Committee on Pipe Coatings and Corrosion: J. K. Crowell, S. R. Dresser Manufacturing Co., Bradford, Pa.

Report: Progress in Pipe Coatings Research: Dr. Scott Ewing, research associate, Bureau of Standards, Washington, D. C.

Presentation: Summary of Progress in Corrosion Research of the A.P.I.: Dr. Gordon Scott, research associate, Bureau of Standards, Washington, D. C.

Paper: Correlating Soil Characteristics with the Corrosion on an Oil Line: Dr. I. A. Denison, Bureau of Standards, Washington, D. C.

Report: Committee on Economics of High Pressure Transmission of Gas: G. A. S. Cooper, Public Service Electric & Gas Co., Newark, N. J.

Discussion: High Pressure Transmission of Natural Gas.

Pipe Line Flow Committee, Natural Gas Department: E. L. Rawlins, Bureau of Mines, Petroleum Experiment Station, Bartlesville, Okla.

Report: Pipe Materials, Standardization of Plain End Fittings: M. I. Mix, The Peoples Gas Light & Coke Co., Chicago, Ill.

Friday, April 11, will be given over to papers on "The Training of Fitters," by W. J. Buckley of the Peoples Gas Light & Coke Company of Chicago, and "Shop Practice and Customer Service," by T. J. Perry of the Brooklyn Union Gas Company of Brooklyn, N. Y. Following these two papers an open forum will be held, to be continued in the afternoon, which will be devoted to a discussion of problems introduced by the delegates on matters not covered in the papers and reports listed on the program.

1930 Calendar

Mid-West Gas Association—Waterloo, Iowa, April 14-16, 1930.

Arizona Utilities Association, Pacific Coast Gas Association—Joint Conference, Arizona Biltmore, near Phoenix, April 16-19, 1930.

Southern California Meter Association—April 24, 1930.

Southwestern Gas Measurement Short Course—Norman, Oklahoma, April 15, 16, and 17, 1930.

Southern Gas Association—Savannah, Ga., April 22-24, 1930.

Missouri Association of Public Utilities—Springfield, Mo., May 1, 2, 3, 1930.

A.G.A. Natural Gas Dept.—Hotel Roosevelt, New Orleans, Louisiana, May 5-8, 1930.

Natural Gasoline Association of America—Tulsa, Okla., May 20-22.

Canadian Gas Association—Halifax, Nova Scotia, June 24-25, 1930.

Annual Northern Conference Pacific Coast Gas Association—Seattle, Wash., June 26-27, 1930.

Pacific Coast Gas Association—Huntington Hotel, Pasadena, Calif., September 9-12, 1930.

American Gas Association—Municipal Auditorium, Atlantic City, N. J., October 13-17, 1930.

25th Convention *of* Mid-West Group

versary Convention at Waterloo, as released from the offices of Joe Carmichael, the Association's director of publicity.

Monday, April 14

Morning Session

8:30—Meeting of Officers, Council and Past Presidents; Meeting of Nominating Committee; Meeting of Auditing Committee.

Registration: Mezzanine Floor, Russell-Lamson Hotel.

10:00—Call to Order, Pres. E. H. Vieregg; Address of Welcome, Mayor of Waterloo, Iowa; Response, H. B. Maynard, Waterloo, Iowa.

10:15—Address, B. J. Mullaney, Chicago, Ill., President, American Gas Association.

10:35—Report, Industrial Section, American Gas Association, E. E. Hahn, Cedar Rapids, Iowa, Affiliation Representative.

10:40—"Natural Gas as Applied to Existing Gas Systems," E. L. Fisher, United Light & Power Co., Davenport, Iowa.

11:00—Report of Secretary-Treasurer.

11:05—Report of Auditing Committee.

11:10—Election of New Members.

11:20—Report of Nominating Committee.

11:30—Election of Officers.

Afternoon Session

2:00—Meter School, Joseph Ainsworth, Iowa Railway and Light Corporation, Ames, Iowa.

2:20—House Heating:
(a) "Hot Air Furnaces," W. E. Derwent, Geo. D. Roper Corp., Rockford, Ill.
(b) "Conversion Burners," R. H. Luscombe, United Light & Power Engineering & Construction Co., Davenport, Iowa.

3:20—Report Manufacturers Section American Gas Association, A. T. Barrett, Affiliation Representative, American Meter Co., Chicago, Ill.

3:25—"Developments in the Manufacture of Gas," Louis Stein, Northern States Power Co., Minneapolis.

Tuesday, April 15th

(Cleanliness Day)

Morning Session

10:00—Report, Advertising Section, American Gas Association, E. J. Boyer, Affiliation Representative, Minneapolis, Minnesota.

10:10—"The Future of the Gas Industry," Floyd Parsons.

10:40—"The Cleanliness Institute and Its Possibilities in Load Building," M. N. Marshman, Director of Cleanliness Institute, New York, N. Y.

11:20—"Complete Gas Laundries for the Home," James Trainer, W. E. Lamneck Co., Columbus, Ohio.

11:40—Report, Commercial Section, American Gas Association, Joseph Shilling, Affiliation Representative, Des Moines, Iowa.

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Afternoon Session

2:00—Report, Technical Section, American Gas Association, A. W. Borden, Affiliation Representative, Hastings, Nebraska.

2:15—"Development of Domestic Load Through Automatic Water Heaters," R. H. Lewis, Ruud Mfg. Co., Pittsburgh, Pa.
Discussion.

2:55—"Gas Refrigeration," A. J. Peters, N. Y. Consolidated Gas Co., New York, N. Y.
Discussion.

6:30—Banquet.

Wednesday, April 16

Morning Session

10:00—Report Accounting Section, American Gas Association, Carl B. Myers, Affiliation Representative Cedar Rapids, Iowa.

10:15—"Training of Salesmen," Alfred A. Uhalt, General Electric Co., Cleveland, Ohio.
Discussion, C. A. Nash, Davenport, Iowa.

11:00—"Customers Relations and Co-operation with Other Departments," E. J. Otterbein, Peoples Light Co., Davenport, Iowa.

11:30—President's Address, E. H. Vieregg, Central Power Co., Grand Island, Nebraska.

2:00 p. m.—Meeting of New Council.
Adjournment.

OFFICERS

Officers for the Association year now closing have been the following:

President, E. H. Vieregg, Central Power Company, Grand Island, Nebraska.

1st Vice-President, J. M. Drabelle, Iowa Railway & Light Company, Cedar Rapids, Iowa.

2nd Vice-President, J. K. Swanson, Minneapolis Gas Light Company, Minneapolis.

Secretary-Treasurer, R. B. Searing, Sioux City Gas & Electric Company, Sioux City.

The Executive Council, which together with the officers, directs the course of Association affairs, this year has been made up of W. E. Derwent, C. C. Hellmers, James A. Trimble, L. W. Wade, R. H. Garrison, H. R. Schmidt, R. E. Taylor, and R. L. Klar.

GAS METER SHORT COURSE

An enterprise conducted under the auspices of the Mid-West Gas Association, and one which is growing in value, is the Gas Meter Short Course. Each year since its inception the Course has broadened its scope, in the interests of better serving the technical advancement of gas operation in the section. R. L. Klar, who as chairman of the 1929 Short Course committee devoted much time and energy to this program, summarizes the purposes and accomplishments of the Course for *Western Gas* readers in these paragraphs:

"The December, 1929, Course was the ninth in the series sponsored by the Mid-West Gas Association and Iowa State College. The Meter Short Course may well be termed the chief activity of the Mid-West Gas Association. Since its inauguration, there has been a decided awakening on the part of gas men as to the important part gas meters have in the gas industry. Even though other things than meters have been taken up in the Course, it must not be assumed that meters will ever lose their interest.

"The first departure from a purely meter school came as a result of the desire on the part of those attending to know something about the handling of meters in the distribution department. When this type of information had been thoroughly disseminated, there was a desire on the part of those attending for other distribution subjects to be discussed. Then, the production men in our district felt that the Course should offer something of direct benefit to them. Accordingly, production subjects were introduced. Then, the Mid-West Gas Association at its convention, to a large degree, dropped technical and operating subjects. The Gas Meter Short Course and Conference at Ames, in December, and the general Convention of the Association in April, make up two quite distinct but coordinating features.

"The Committee in charge of the Short Course has been alert to present subjects that are most timely and pertinent to the problems of the Mid-West section. Topics for discussion are suggested by letters received during the year, from gas men in the Middle West, and an attempt is made to discuss those questions which will interest the greatest number."

Gas men of the Mid-West territory will do well to make plans for attending the Waterloo meetings, which commemorate the Association's long period of service and introduce another era in which cooperative effort of the industry through the Mid-West organization will find an even wider field of usefulness.

LINE TO WILLISTON TO GET UNDER WAY IN APRIL

Construction of the pipe line to be built from Glendive, Montana, to Williston, North Dakota, by the Montana-Dakota Power Company, is expected to start in April, according to recent reports from the Montana press. The line will be 90 miles long, and is expected to be complete by September 1, 1930.

Route of the line will be through Savage, Sidney and Fairview, making service available in these three towns as well as Williston and also the farms along the route of the line.

The company also contemplates the construction of a compressor station in the gas field approximately 40 miles south of Glendive.

The cost of the gas line from Glendive to Williston including the several distribution systems will exceed $1,000,000.

MOUNTAIN STATES POWER CO. CONTROLS MORE UTILITIES

Several utilities have been transferred to the Mountain States Power Company, a Byllesby subsidiary, according to H. C. Cummins, assistant to the vice-president in charge of operation of the Byllesby Engineering and Management Corporation. Among them are Northwest Gas and Pipeline Company, and the Thermopolis Gas Company of Thermopolis, Wyoming.

Classification *of* Sales

(Continued from Page 27)

require only a minimum of training to develop them into satisfactory representatives of the company in this field.

In the hotel and restaurant field, we deal with known prospects having known requirements. Our advertising must be highly specialized and the men selected for this work must have some previous experience either in the gas company or outside. In this class, the per meter sales are large and the load factor is very good. Sales effort, therefore, can be arranged on a very generous scale.

Selling industrial gas, especially, is in a class by itself. Here we have to deal with executives and technical men. We have to study the methods and processes of manufacture in order to adapt or develop suitable gas-fired equipment. Consequently, we must employ high class engineer-salesmen who can speak the language of their clients and who are capable of promptly mastering the details of a variety of manufacturing operations. And again, the advertising must be highly specialized and the whole selling plan keyed up to the importance of this branch of our business.

Originally househeating was classified under domestic. We soon found that for the purposes of sales promotion, it required special treatment. Our best househeating prospects are builders of new homes. Immediately the architect and the builder come into the picture, and a real problem presents itself. How to sell the architect and the builder—a problem calling for a carefully planned sales and advertising effort. Here the sales engineer must know how to figure heat losses, radiation, etc., and be able to deal with difficult installation problems.

From these considerations, it would seem to be obvious that from the point of view of proper direction of sales effort, each of the classes referred to constitutes a separate and distinct business.

Hats and shoes are both wearable, but we have hat stores and shoe stores. Suppose a department store were to attempt to merge its different departments and run them all with the same kind of personnel and the same merchandising methods. Without classification, losses of one department would be covered by the profits of another. This very thing has happened in our own industry. In more than one large city, there has been a steady and fairly satisfactory increase in total sales. However, on analysis it was found that this increase was made up of increases due to new avenues of sales and increases in population, notwithstanding a per meter decrease in the domestic load. In other words, it was discovered that a very important part of our business had been attacked by a disease, the symptoms of which were not discernible in any available statistics.

We now come to the third purpose for making a classification of sales—that is *to provide an effective base for the intelligent preparation of a budget.*

If the use of gas in the homes and in industry is to grow, the management must carefully plan ahead. Superior sales effort, supported by proper rates, are essential factors in securing new business, but the up-to-date management also recognizes the necessity of budgeting all of its operations.

The real foundation of the operating budget is not an estimate of expected revenue, but rather a carefully prepared estimate of the gas that will be sold in each of the several important classes. From this the estimate of revenue is built up.

It may be true that estimates of prospective gas sales have always been made, but for lack of a better method, we were satisfied to simply apply a flat percentage of increase to last year's total sales.

The budget maker now developes his estimate of gas sales in a scientific way. He does not make the mistake of considering the business as a whole. He takes one class at a time and gives consideration to factors that affect sales.

For example, in the domestic class, he will consider such things as increase in population, trend of consumption per meter, weather and employment conditions. In the industrial class, he is concerned with influences of a very different character. Here the prices of competitive fuels and the general business conditions are the important factors.

Assuming, then, the usefulness of detailed sales information, and that there is a real need for classifying gas sales into a reasonable number of divisions, we will consider a few of the methods that might be employed.

In the 1927 report of the American Gas Association's Committee on Statistics and Cost Accounting, J. L. Conover, chairman of a subcommittee, treated the subject "Analysis and Classification of Gas Sales," describing in detail the mechanized analysis of the sales of a large company, giving as a practical example a classification with 86 divisions, grouped into eight principal sections, with their respective sub-totals. This serves to point out that with some mechanical equipment, the analysis can be carried to great refinement. This, however, may not be the ordinary requirement. A classification into a limited number of divisions, showing the number of customers, total sales, and average monthly consumption per customer will reveal facts which can be used to great advantage for rate studies, for sales promotion, for budgeting of sales, and other diversified statistical purposes.

A classification under five or six heads can be made part of the regular billing routine with little or no additional expense. No machinery is necessary. All that is required is to have a code number on the addressograph plate and to recapitulate under the code numbers. A modification of this is to print an extra coupon on the bills, which are cut off just before the bills are issued, then sorted and accumulated on adding machines. When there is only one meter for two classes of consumption, very satisfactory methods of dividing the consumption can be worked out.

However, except for very small companies, the use of tabulating machines, so that more detailed data may be obtained, is very desirable, and the cost will be more than justified by the benefits to be derived.

As a matter of fact, classifying sales is so important for a proper understanding of our business that it is difficult to see why any company should hesitate to spend whatever amount is necessary to accomplish this end.

F. C. WALTERS TAKES POST VACATED BY E. A. CLARK

Announcement has been made by the Oklahoma Natural Gas Corporation of the appointment of F. C. Walters as superintendent of city distribution plants, for the company, succeeding E. A. Clark, who recently resigned.

Mr. Walters, who is a graduate in chemical engineering from the University of Kansas, class of 1918, has been associated with the company since 1921. He has been very active in gas measurement work since joining the company, and last year was a member of the general committee of the Southwestern Meter Short Course, held annually at the University of Oklahoma at Norman. Prior to appointment to his new post, Mr. Walters was superintendent of gas measurement.

B. L. Maulsby, chemist, has been appointed to succeed Walters as superintendent of gas measurement. A. F. Dunn has been made assistant superintendent of city plants and Gilbert Estill assistant superintendent of gas measurement.

A. G. A. ACCOUNTING SECTION APRIL 3-4 IN CHICAGO

The Second Annual Spring Conference of the Accounting Section of the American Gas Association will be held at Hotel Stevens, Chicago, on April 3 and 4. Members of the Accounting Section, as well as representatives of gas companies who are interested in developments of utility accounting and customer relations, will participate.

A program has been prepared, designed to meet the needs of general executives, accountants, personnel men, and customer relations executives, and exhibits of late developments in office equipment will be offered. An attendance of over 400 is expected, according to John L. Conover, chairman of the A. G. A. Accounting Section.

H. C. Darlington, convention manager, Hotel Stevens, Chicago, is accepting reservations for hotel rooms.

NAT'L SAFETY COUNCIL TO HOLD SESSIONS SEPT. 29-OCT. 4

The 19th Annual Safety Congress of the National Safety Council will be held in Pittsburgh, Pennsylvania, September 29 to October 4, inclusive. The William Penn and Fort Pitt Hotels will be headquarters for the meetings.

Offices of the Council have been moved from 108 E. Ohio Street, to the Civic Opera Building, 20 North Wacker Drive, Chicago.

P. G. AND E. ASKS PERMIT TO SERVE GAS IN BENICIA

Pacific Gas and Electric Company of San Francisco has asked the California Railroad Commission for a certificate to supply gas in Benicia, Solano county. Manufactured gas from the company's plant at Vallejo will be used until natural gas becomes available, should the petition be granted.

LOGAN GAS CO. GETS 25-YEAR FRANCHISE AT MULHALL

The Logan Gas Company of Oklahoma City, Oklahoma, has been granted a 25-year franchise in Mulhall, Oklahoma, for the service of natural gas. Construction of the line will begin immediately.

M. J. MUNN APPLIES FOR PERMIT AT HEBER SPRINGS, ARK.

M. J. Munn has asked for a 25-year franchise for the service of natural gas to the town of Heber Springs, Arkansas.

Carroll Operating Mgr. *for* Houston Utility

HARRY P. CARROLL has assumed duties as operating manager of Houston Gas and Fuel Company, subsidiary of United Gas Company, a Moody-Seagraves interest, of which Alba H. Warren is vice-president and general manager.

The office of operating manager is a new post recently created in the organization.

Harry P. Carroll

For 19 years Mr. Carroll has been associated with the companies supplying fuel gas to Beaumont, Texas, and for the last four years has been general manager of the Beaumont office and district manager of Southern District of Dixie Gas and Fuel Company and Dixie Gulf Gas Company, subsidiaries of United Gas Company.

Mr. Carroll started as an office boy for the old Beaumont Gas Company in 1911, and moved along through various departments until 1917, when he was named assistant manager. Four years ago he assumed the managership of the company, and later became district manager. Under his direction towns from Orange to Houston were supplied with gas, while more than 75 miles of the main pipe line furnishing gas to many east Texas communities were under his management.

He has received his training in utility fields under three different ownerships. He was first employed by the Dawes brothers and was retained in an executive capacity by the Insull interests and held the same office when the company was purchased by the Moody-Seagraves interests.

Texas Gas *for* Chicago Probable *in* 1930

TEXAS Panhandle gas for Chicago consumption is a possibility for 1930, if the activities of several companies, said by recent news dispatches to be combined in the project, are brought to a head.

According to present plans, two lines will be laid over the same right of way, though sufficiently far apart to prevent interference. The reports state that the first line probably will be completed this year, will be between 800 and 900 miles long, and will be constructed of 24- or 26-inch pipe. Contracts for the pipe are expected to be let in from 30 to 60 days. Cost of the project will be in the neighborhood of $100,000,000.

Standard Oil of New Jersey, Phillips Petroleum, Skelly Oil, The Texas Company, Columbian Carbon, Cities Service and the Insull interests are understood to be combining forces in the project. The Doherty company will have charge of the construction of the line.

FRANCIS E. KESTER RESIGNS POSITION WITH SO. COUNTIES

Francis E. Kester, assistant secretary and assistant auditor of Southern Counties Gas Company, recently resigned his position. He began his work with the company in 1912. He was made chief accountant in 1916, and in 1921 was advanced to the position which he held upon his resignation.

SOUTHERN COUNTIES GAS CO.
SERVICE SURVEY AND TEST

S. O. No. 2622 CHART No. 9976 CITY Wilmington
Name John Smith Address 1050-52 Sanford Ave
Pressure Tested 50 lbs. Drop in pressure—Lbs. 6 Riser outside:— yes
Period of Test—Min. 15 Kind of soil Loam Meter boxed yes
Cock at Main ✓ Condition of pipe Good Size of Service ¾
Cock at Prop. line Pressure—High ✓ Date installed
Cock at Curb Pressure—Low Meter & Reg. under bldg. No.
Location 79' Feet East North West South of E-K" St. Ave.

KIND OF LEAKS FOUND

Leak in Meter None
" " " Fittings
" " " Regulator
" " " Stop Cock
" " " Out-let
Leak in Service pipe—Pit Hole Coupling
" " " " —Seam
" " " " —Unions
" " " " —Rusted out
Cu. ft. per hour

Service Renewed No Service repaired Yes Service retired No.
S. O. No. Rep. O. No. W. O. No. Ret. O. No.

Remarks: Tested main-meter with 1-hour clock. Original test leak in coupling, repaired. Test 2 (final) OK. Retired 3x¾ saddle & tee corp cock at main. Brazed on coupling at main. Reset 2-meters, 2-new brass risers & reg.

(OVER) Completed by Ritchie Date 1/21/30

Test report form filled out by leakage workmen, giving details of individual repairs

An Intensive Drive *on* Leakage

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We expect to set a meter on these finished tests about twice a year and if the test shows an increase we will get busy and cut it down.

We found that the quickest way to reduce unaccounted-for is to cut pressures on the distribution mains. To do this we had to install larger feeder lines and tie in some of the dead ends. The highest pressure we carry in our intermediate pressure lines in winter is five pounds for the San Pedro district, three pounds in Wilmington, and the other towns two pounds.

Our losses from blowing drips are very little, for the reason that we get very little water or condensates. The blow-off pops on our 50-pound holders are tested once a month for sticking and for leakage.

Another very important item is the measuring of gas. Orifice meter plates and gauges should be calibrated periodically. Samples of gas should be taken at least twice a month and tested for gravity. We have recording thermometers in different localities where we change the charts daily. For each sub-district we have installed an orifice meter on which we change the charts each day. We keep a record of daily consumption and the minimum hour. Whenever this minimum increases we immediately investigate the cause. With this method we know of leakages within 24 hours of their occurrence.

On industrial set-ups, if the load is over 30,000 cu. ft. per hour, we use orifice meters. If it is less than 30,000 cu. ft. per hour, we use displacement meters. In using these meters we find it very important to see that they are not overloaded. They are given accurate tests in the field at least semi-annually by experienced employees of the company who do this work over the entire system.

As another item in our leakage prevention, our meter readers are instructed to watch for by-passes, dead trees, and discolored lawns. All reports of leaks or suspected leaks coming to us from any employee or anyone else in the community are followed up at once. At our monthly meetings we discuss this subject with our company employees. Our bulletin boards carry the results of our progress, announced throughout the company's system by the general office.

In this phase of our work for 1930 we are installing long distance gauges at the ends of our mains so that we can cut our pressures to the minimum and still maintain the excellent service we have been giving.

The practice of odorizing gas will be introduced in this district shortly, which will enable the public to assist us in finding leaks.

In spite of the rather startling cost of valves, replacement of street paving, and the primary cost of labor, it is conservatively estimated that the saving resulting from our intensive leakage elimination campaign will "pay out" in three years.

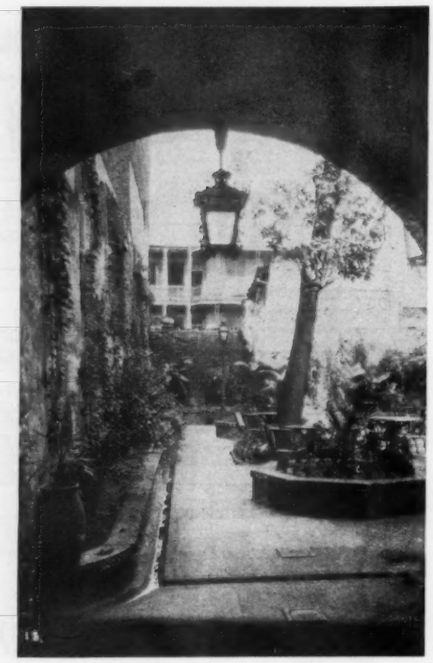
IOWA-NEBRASKA L. & P. TO SERVE GAS IN MORE NEBRASKA TOWNS

The Iowa-Nebraska Light & Power Company has announced plans for the serving of natural gas in Geneva, Fairmont, Exeter, Aurora, York, and other Nebraska towns, from the gas carrier recently constructed by the Nebraska Pipe Line Company from the Kansas gas fields to Nebraska towns. The Iowa-Nebraska system will tap the Kansas line, which extends diagonally across Clay county, Nebraska, at a point near Harvard, Nebraska, according to report. Natural gas franchises have already been granted the company in some of the towns.

BRISTOL COMPANY OPENS OFFICE AT LOS ANGELES, CAL.

The Bristol Company of Waterbury, Conn., manufacturer of recording instruments, recently opened a new sales and service office in Los Angeles, California. S. W. Case has been appointed district manager, and W. H. Rogers, sales and service engineer. Both these men have a background of several years experience in the use of recording, indicating and control instruments, particularly as applied to industrial applications.

St. Charles Avenue—one of New Orleans' many beautiful residential boulevards.



A shaded nook in the 150-year-old Patio Royal, at 410 Royal Street, New Orleans.

A Travelogue *of* New Orleans

for visiting gas men

(Continued from Page 35)

few other spots in the whole wide world can afford.

Sluggish, silent bayous—the stillness broken only by the occasional splash of an alligator or a gar—winding their way beneath the interlaced branches of century-old oaks and cypresses—with long strands of Spanish moss dangling from their limbs.

These are the scenes through which Longfellow sent Evangeline.

But close your eyes for an instant, and you are wafted as on a magic blanket to the white shell beach of Lake Pontchartrain, or to the booming surf of Grand Isle, or to the beauties of the Gulf Coast.

In the teeming commerce of the broad "Father of Waters"—the World's greatest river—there is romance to be found. Here the ships of all the world meet and exchange the products of all its nations.

Thus in bold strokes is painted the pic ture of New Orleans. Now let us fill in some of the highlights that will make this picture memorable to gas men long after the Natural Gas Department's New Orleans conference is a thing of the past.

A Dual Personality

Nestling in the heart of the New Orleans of today, practically as it was in the days of Baron de Carondelet and the Louisiana Purchase, is the Vieux Carre, or The Old Quarter—the New Orleans of a century or more ago.

Outside the boundary of Esplanade Avenue, the New Basin, Canal Street and the river is a city that is growing and that heralds its opportunities to the world—a city that looks to the future. Within the boundaries is a city of the past—a city that whispers reminiscenses of olden days of luxury and languor.

The Place D'Armes

Just as the *Vieux Carre* is the heart of New Orleans, the *Place D'Armes* is the heart of the *Vieux Carre*. It was within and around the old tall iron pickets that mark the square of the Place D'Armes that most of the incidents recorded in the history of New Orleans took place.

It was on this historic spot that the Louisiana Territory, constituting most of the Mississippi Valley, was transferred three times—from France to Spain, from Spain to France, and finally, with the Louisiana Purchase, to the United States.

It was around Jackson Square, as the Place D'Armes is known now, that the gay social life of the city of old was centered.

The St. Louis Cathedral

Facing the square on one side is the old St. Louis Cathedral on the site selected by Bienville—the city's founder—214 years ago.

The foundations upon which the Cathedral stands today were laid in 1724—the first brick church building in the South. Changes and additions have been made, but the Cathedral stands today practically the same as it has stood for close to two centuries.

In the crypt of the old church are the tombs of many men of history, notably Don Andraes Almonaster y Roxas.

The Cabildo

Beside the Cathedral on one side stands the Cabildo, for nearly a century the seat of government, and on the other stands the Presbytere—two of the most interesting buildings in Mississippi Valley history.

The buildings were erected by Almonaster y Roxas during the regime of the Spanish Governor Baron de Carondelet in 1795. It was in the Sala Capitular (main chamber) of the Cabildo that the Louisiana Purchase—later divided into 14 states—was transferred to the United States by representatives of Napoleon and Thomas Jefferson.

The Presbytere, on the other side of the Cathedral, was built a few years later as the house of the Capuchin Priests. It was later occupied by the state civil courts. Both buildings now house the many interesting exhibits of the Louisiana State Museum.

The Pontalba Buildings

Flanking the Place d'Armes on both sides are the buildings that Don Almonaster y Roxas erected in 1849 in honor of his daughter, the Baroness de Pontalba. In the old days these buildings, now tenements, were sumptuous apartments and still bear in the iron scrollwork of the balconies the monogram of their noble mistress.

Other Points on Place D'Armes

In the center of the square stands the famous equestrian statue of Andrew Jackson, the work of Clark Mills, set up in 1856 at a cost of $30,000, and upon the base of which General Butler during the civil war cut the words, "The Union Must and Shall be Preserved."

In St. Peter Street, one block from the square, is the quaint old house in which Jenny Lind lived during her years in New Orleans.

At 514 Chartres Street, two blocks from the square, is the Napoleon House, to which Girod, a wealthy merchant, and Dominick You, one of Lafitte's pirates, planned to bring Napoleon from St. Helena.

The French Market

As interesting today because of the exotic life that teems through, in and around it, as it is because of its historic significance, is the French Market, just off the northwest corner of the Place d'Armes.

The people of many nations and many races barter for the necessities of life in the old buildings. Sunday mornings when the carts of foreign truck farmers surround the place is the best time to see the French Market.

The market was first built here by the Spaniards in 1791—139 years ago. Part of the old structure was replaced in 1813, a vegetable market was added in 1822, and the bazaar in 1872. No more colorful picture of life can be found anywhere. Little Italy—where thousands of Italian families are housed in tenements, bounds the market on one side.

The Archbishopric

The oldest building in the Mississippi Valley is the Archbishopric, erected in 1727 on Chartres Street between Hospital and Ursuline. The seminary connected with the Archiepiscopal Palace was built early in the 18th century on the site of a Chapel erected in 1787 by Don Almonaster y Roxas for the Ursuline Nuns. The church fronting the street—the Church of St. Mary—was built in 1846, and contains many interesting relics.

The Beauregard House

Another link to the days of yore stands across Chartres Street from the Archbish-

opric. It is the house in which Paul Morphy, the world's greatest chess player, was born. It was later the home of General Beauregard, who directed the Confederate forces at the Battle of Shiloh. Until the 18th Amendment was enacted, it was occupied by Silecian wine merchants.

The Cafe Des Refuges

Half a block up Chartres Street from Dumaine stands the Cafe des Refuges, full of historic memories, the rendezvous of pirates and buccaneers in days of old. Here it is said "Le Petit Couave," the famous cordial, was concocted for the first time.

A half block away at Dumaine and Chartres Streets is a Spanish tiled roof house of the 18th century, where, so the story goes, a raid upon the sunworshipping Natchez Indians was planned.

Old Absinthe House

More than a century of dripping absinthe —since 1798—wore depression over two inches deep in the marble counter of the bar of the Old Absinthe House at Bourbon and Bienville Streets. It was here that many of the famous old drinks of days that are no more were originally made.

The construction of the Old Absinthe House, like that of many others, is distinctly European and unlike anything seen elsewhere in America.

The Haunted House

Those who have read the novels of George Washington Cable feel that they know the Haunted House, which stands at Royal and Hospital Street, without ever having seen it.

The mysterious old mass of decrepit masonry was occupied as far back as 1813 by Mme. Lelaurie, notorious because of the tortures she inflicted on her slaves. The ghosts of the murdered negroes now haunt the old building, 'tis said. Lafayette was once a guest in the ancient structure, from which the cruel occupant was finally driven by an infuriated populace.

Old Orleans Theatre

A 3-inch cypress floor upon which in the days before the Civil War the mad, masked balls of the "quadroons" were danced is still to be seen in the old Orleans Theatre, in Orleans street just off Royal. By a strange reformation the old building now houses the devotees of the Sisterhood of the Holy Family.

North Rampart Street

In 1793 Baron de Carondelet, the Spanish Governor, built the outer lines of the city defenses along what is now known as Rampart Street. That is how it got its name. The neutral ground upon which the street cars run was once a moat running along the old walls.

The Terminal Station stands on the site of old Fort Burgundy.

Congo Square

Down North Rampart Street, running from St. Peter to St. Ann Streets, is the famous Congo Square, now known as Beauregard Square, where the weird and repulsive rites of the Voodoo Queens were enacted up until 1900. The Queen—Marie Leveau, a mulatress—led the mystic cult. She lived at 1036 St. Ann Street, where, in an alabaster box she is supposed to have kept the "Great Zombi," the serpent whose food was little children. Voodooism is a form of pagan superstition brought from the African Congo by the slaves.

The Old St. Louis Cemetery

The lives of the men who are buried in the Old St. Louis Cemetery on North Rampart Street, if put in story form would tell a complete history of Louisiana from 1708 when it was first laid out.

It is interesting, too, as an example of the above-ground burial, so different from that of other parts of the country. Even the walls are tombs, three tiers high. The noted Louisiana historian, Charles Gayarre, and other notable men were buried there.

The Rue Royale

Because it is more typically European than any other street in New Orleans, and because it is the main connection thoroughfare between old and new New Orleans, Royal Street is one of the most interesting in the city.

It is one of the city's busiest but narrowest streets—scarcely 25 feet from curb to curb—and towering on both sides of it are the old buildings with their wrought iron balconies and court yards that make the New Orleans Vieux Carre so different.

Almost from Canal to Esplanade Avenue the brick buildings are constructed on the European style with the common brick partition all between them.

The Paul Morphy Home

Partly Moroesque and partly Spanish in its style, but preserved in the glory of its ancient architecture by a New Orleans philanthropist, at 417 Royal street stands the home of Paul Morphy, the great chess player. It was built by the Louisiana Bank in 1816, and secret underground passages connected it with the building on the corner of Conti Street where the banking operations were conducted.

Spanish Commanderia

Another building of the same type as the Morphy Home stands at 527 Royal Street. It was built by Governor Miro in 1784, and was used as the headquarters of the Spanish Mounted Police.

The Shrine of St. Roch

In the lower part of the Old Quarter stands the Shrine of St. Roch, a chapel built in 1871 by the devout hands of Father Thevis in fulfillment of a vow he made in the epidemic of 1866, based on the salvation of every member of his flock from death during the scourge.

The shrine is surmounted by a statue of St. Roch, and it has gradually drawn to it many of the suffering and afflicted.

There is a tradition that young girls of the city go to St. Roch's to pray for husbands—making the pilgrimage on nine successive days in bare feet.

Chalmette Monument

Down at the lower end of New Orleans on the Mississippi is Chalmette, where the Battle of New Orleans was fought in 1815, where is still standing the mansion in which the British general, Packenham, died, and where one of the world's largest sugar refineries is now located.

Other Points of Interest

The ruins of Spanish Fort, where Bayou St. John meets Lake Pontchartrain, marks the spot where Bienville landed before founding the city. The fort was built during the days of Spanish dominion and used often in ancient days to protect the city.

Metaire Cemetery on the way to West End, was founded in 1872 on the site of which was for 30 years America's most noted race track. The bodies of some of the noted leaders of the Confederacy are interred here. Jefferson Davis' body was buried in Metairie for two years.

Mississippi levees line the banks of the river on both sides, in times of high water restraining the waste water of the entire Mississippi Valley within their banks.

Liberty Monument at the foot of Canal Street marks the spot where the Reconstruction days were ended in New Orleans, with a battle between the metropolitan police and a small body of determined citizens. The monument was erected in memory of 14 citizens who were killed.

The Mint, at Esplanade Avenue and Chartres Street, is the oldest mint building in the United States. It was erected in 1821, on the ramparts of the old Fort General Jackson, from which Andrew Jackson reviewed his troops in the war of 1812.

The Antique shops of Royal Street are rife with books, trinkets and all sorts of things of interest to the visitor. Nearly all of them connect in some way with passages from the history of New Orleans that read like stories conceived by a rich imagination.

Natural Gas *for* Montana Mining Centers Reported

ANOTHER major gas transmission line project is expected to be brought to the construction stage before the snow flies next winter, according to recent news dispatches from the Rocky Mountain district. A pipe line from northern Wyoming to Anaconda and Butte, Montana, 310 miles long and costing approximately $20,000,000, with distributing systems in several smaller towns along the route, is said to be considered. Companies named by the reports as being interested in this major development are Hope Engineering Company of Mt. Vernon, Ohio, and the Moody-Seagraves interests of Houston, Texas.

Source of the line would be the Big Horn Basin in Wyoming; from thence it would progress in a northwesterly direction over some of the most mountainous terrain in the United States to the mining centers of Butte and Anaconda, where the industrial load of the smelters would be converted to natural gas. Bozeman and Helena, both good-sized towns, the latter the state capital, would add appreciably to the domestic load.

Other companies named as being interested in the development of this line are the Ohio Oil Company, Midwest Refining Company, the Producers & Refiners Corporation, and the Kinney Coastal Oil Company.

CANADIAN WESTERN MAY BUILD LINE TO EDMONTON

Canadian Western Natural Gas Light, Heat & Power Company, Ltd., with headquarters in Calgary, Alberta, is investigating the possibilities of a gas transmission line between Edmonton and Calgary, according to C. J. Yorath, president and managing director of the company.

LANDERS MAKES PACIFIC COAST SURVEY FOR ROBERTS-GORDON

R. E. Landers, sales manager for the Roberts-Gordon Appliance Corporation of Buffalo, New York, is making a survey of the Pacific Coast and mid-continent fields during February and March.

Cleaning Natural Gas

(Continued from Page 29)

firms are manufacturing scrubbers ready for installation.

As a result of scrubbers already installed, we have eliminated practically all of the trouble formerly experienced from dust and believe that the majority of dust in the pipelines has been collected. Increasing the velocity of gas or changing its flow may loosen up dust which would give considerable trouble if dust scrubbers were not available.

To eliminate the principal cause of dust formation, it was necessary to find means of drying the gas, thereby eliminating all vapors and other elements causing the corrosion. This can best be brought about by:

1. Avoiding taking residue gas if other things are equal.
2. If necessary to take residue gas, it should come through absorption plants to eliminate carbon dioxide and gasoline fractions as much as possible.
3. After coolers at compressor stations should be run as cold as possible.
4. Dust scrubbers should be placed in front of all compressor stations and all town regulating stations.
5. Oxygen content of the residue gas should be checked and kept as low as possible.
6. Gas lines leaving compressor stations should be carefully dripped in a zone of from 2 to 12 miles.

FREEZE-UPS

Gas taken into transmission lines from residue plants has caused operators considerable trouble at certain times of the year due to freezing. It has been necessary to develop means of meeting conditions that may appear in a pipeline during a freeze-up which may be at a low point, on a hillside or at some unsuspected place at any time during thawing weather conditions. Freeze-ups usually occur where gasoline vapor is suspended in the gas, either from wet walls or residue plants. There is no exact science of freeze-ups; therefore, they are very troublesome. However, most troubles occur in field lines before the gas gets into the main lines. Pressure observations usually indicate a freeze-up is starting or is completely obstructing the line. We believe that a freeze-up near a residue plant may be started by a very small particle of vapor fluid attaching itself to a slight obstruction in the pipe, perhaps a nib from a pipe weld, and that as the flow of gas continues with vapor laden particles, the obstruction will grow until it either completely stops the line or causes a decided decrease in the flow of gas. If it is possible to catch a freeze-up before it has gone too far, it may be overcome by quick action. Various methods are employed to dislodge the obstruction or dissipate it. It may be dislodged by releasing line pressure, heating the pipe or giving the freeze-up an alcohol physic. Alcohol has proved very effective in many cases. If the portion of ice is dislodged, it may be blown out at drips. Complete freeze-ups are practically impossible to locate except by a minute investigation and taking of pressures along the line. If alcohol or releasing of pressure will not dislodge or thaw the ice it is sometimes necessary to shut in the line for several hours. Trouble of this nature can be avoided by constantly watching the condition of gas as it leaves plants and blowing drips regularly. Some operators prefer to install syphon drips on low places along field lines. This type of drip should not be installed in lines carrying residue gas for the reason that they offer obstructions and usually fail in getting all water out of a low place.

Laying lines from residue plants should be done with great care and if possible they should be constructed to grade to avoid gathering places for moisture or liquids.

RECLAIMING OIL LINES

When pipelines are laid in field or city they should be carefully inspected for internal corrosion or other obstructions. Cases have been known where old oil lines have been reclaimed, carefully swabbed out and placed in service for the transportation of gas. Ordinary swabbing may prove satisfactory except where high pressures are used. The high velocity of gas will clean off paraffin and push it through the line to some point where it will start to roll up and act as a complete obstruction. In other cases, it may cause serious trouble in line pressure or fluctuation of pressure in such manner as to impair satisfactory service. When such a condition develops, the line should be completely blown and properly tested to see that no further obstructions are possible to cause interruptions or trouble in pressure.

On a section of a 20-inch line, it was found necessary to install a compressor station to increase the capacity of the pipeline. Gas flowing through this line was known to be dry gas and no trouble had been experienced at the inlet compressor station or the outlet compressor station hundreds of miles away. After this intermediate station was installed, a dust condition developed which began to give us much trouble as experienced elsewhere from internal corrosion dust. The particular difficulty in this case seemed to be in the lubrication. The dust was mixing with the regular lubricating oil, producing a cutting action on liner, piston and rings. The dust could not be accounted for except from an insufficient cleaning of the pipe at the time of installation. The pressure of the gas and the velocity of flow at the point of installation was changed to such an extent that it was believed sand and dirt allowed to stand in the pipeline at the time of construction, was being stirred up and was causing the trouble. A dust scrubber was constructed at this station and no further trouble resulted.

A second lubricating difficulty developed from gasoline content present in the gas cutting the regular lubricating oil within the compressor cylinders, resulting in excessive wear on liners, pistons and rings. By substituting a special lubricating oil containing a 23 per cent castor oil blend, no further difficulty was experienced.

DUST IN DISTRIBUTION MAIN

While the first serious dust trouble affected the consumers and caused much uneasiness in distribution centers, the greatest expense and trouble has been along the main line. However, the distribution man has had plenty of trouble with his system when he has changed from manufactured gas or from mixed gas to straight natural gas. An article appeared some time ago in one of the gas magazines relating to the trouble experienced in the distribution system of a western city. Mixed gas had been handled through the system for several years. Moisture and oxygen were present in the mixed gas. Corrosion had developed internally, but introduction of natural gas which was much drier had caused the corrosion to become loosened, and during peak loads when the gas was traveling at high speed there were many complaints. A dust trap was devised and was installed at various points, particularly at district regulating stations near the points giving the most trouble. It was found that as soon as the scrubbers were in operation, the number of complaints diminished at once. If dust was collected rapidly, it tended to decrease the efficiency of the system and complaints increased accordingly. The company found that from an earning and public relation standpoint the dust scrubbers were very practical and profitable.

Manufactured gas contains enough moisture and tar products to insure low leakage through calked joints. The introduction of natural gas which contains no moisture, does not allow the hydrostatic action of jute fibres to continue, and a drying out process will soon permit the escape of gas and development of high leakage. Some companies, to overcome this situation, introduce steam mixed with oil into the gas flow to prevent development of leakage through the calked joints.

Natural gas is inherently a dry gas and the introduction of any element or any operation that will allow water vapor or a small portion of air to be injected will soon cause internal corrosion and dust trouble. It is therefore imperative that the transmission company, in handling gas, provide mechanical means for eliminating all injurious substances. Proper equipment must not only be installed to take care of troubles already started, but we should continue to educate the gasoline men and also the gas producer regarding the injurious effect of carelessly handling these products

DE-SULPHURIZING

In some sections of the country natural gas contains varying amounts of sulphur. Used through domestic appliances it discolors various objects, has a disagreeable odor and in general is not acceptable. For general commercial use the sulphur content must be removed and companies meet this condition by de-sulphurizing the gas through plants constructed for the purpose.

Natural gas purchase contracts should include adequate "merchantable gas" clauses. Transmission companies not only have an investment to protect against injurious action from oxygen, carbon dioxide or other corrosive agents, but must continue to deliver a product of the highest quality to the consumer. Limitations as to the amount of hydrogen sulphide, sulphur dioxide or other inert or injurious gases should be clearly defined in each purchase contract. Proper protection clauses of this nature enable transmission companies to control the quality of their supply and at any time allow them to cut off or reduce takes from areas or gasoline plants producing inferior or injurious gases.

The gasoline consumer driving up to a filling station observes the quantity of gasoline he is about to purchase as displayed in a clean container, showing that no injurious particles are suspended in his gasoline, and the gasoline distributor has taught him to expect such service. The housewife purchases her equipment for gas utilization purposes on the representation of the new business man that she is buying a modern appliance which would befit her parlor and is

encouraged to believe that everything about the use of natural gas will do away with drudgery and dirt. Surely the product must be clean from the start or the new business man can not tell a truthful story, and much trouble and expense will be experienced along the line.

The Gasco Goes *Moderne*

(Continued from Page 36)

with the smart shops of our metropolitan centers contribute to make this the outstanding store of Salem.

As another essential in its program for making gas modern in the minds of its consumers, the Portland Gas and Coke Company is on the alert to cooperate in every civic enterprise or activity. The display room and store in the Public Service Building at Portland is not in the main shopping center of town. Yet so many and varied have been the activities on this corner that they have built up a tremendous following of visitors, who came first for special occasions, and who come now sometimes merely to see what is going on. As an example of the community activities into which the company ties its building, the last annual show of the Columbia Valley Dahlia Growers' Association, was held at the gas company offices, and the display room was garbed in festive array for the occasion.

Far afield as many of these activities may seem, they nevertheless have a very close inter-relation with each other, and between the style of type used in newspaper advertisements, and the courtesy shown Portland's civic organizations, there is this connecting link: The Portland Gas and Coke Company feels that if gas is the modern fuel, it must be promoted in the modern way.

In this day of intensely competitive markets "Gas the Modern Fuel" is the rallying cry for all the forces working toward increased gas use. In terms of military strategy it is the counter offensive against modern promotional methods used by every progressive industry, including competitive fuel industries, and notably the electric.

Sales methods of the electric industry are definitely calculated to exploit electricity as the one modern fuel, and stamp all others as obsolete. First the wood fire, then coal, then oil, then gas, and then last of all, the infinite's finest gift to mankind, electricity. Or so at least the electrical industry has told its story. And that the results have been effective no one can deny.

The slogan "Gas the Modern Fuel," then, arrives in the nick of time. Gas appliance manufacturers have come strongly to the front in the move for modernization, giving us the needed appearance values and convenience in their products. The industry is definitely committed to the need for sales promotional effort all along the line. And the final essential is to see that these aggressive steps are taken in the modern manner, so that gas shall establish an indelible association in the consumer's mind as the last word in modern convenience.

Tactics such as the Portland Gas and Coke Company is adopting so successfully in its territory supply the answer to the situation.

MORGAN, UTAH, NOW SERVED WITH GAS FROM BAXTER BASIN

Natural gas from an extension of the Baxter Basin-Salt Lake natural gas transmission line was turned into the mains at Morgan, Utah, during the middle of March.

Southland Greyhound Bus Terminal, Houston, Texas—showing overhead unit gas heater installation

Houston Gas *and* Fuel Co. Installs Overhead Heaters

INSTALLATION of four self-contained gas fired unit heaters has been completed in the waiting room and restaurant of the Southland Greyhound Bus Terminal by Houston Gas and Fuel Company, according to F. E. Farrar, heating and ventilation engineer.

The unit heaters hang from the ceiling, thus being out of the way and saving space. They were put in the building by the new business department under the direction of John Hood. These are the third units of this type to be installed in Houston, the others being in industrial concerns.

Remodel Santa Monica Offices *of* So. Counties

DISTRICT headquarters of Southern Counties Gas Company at Santa Monica, Calif., have recently been entirely remodeled, and an informal opening was held on Saturday afternoon, March 22. From 2 o'clock in the afternoon until 10 in the evening visitors were welcomed and refreshments were served.

The exterior of the newly refinished building is attractively "modernized," with new display windows in antique bronze. These windows are being used for first showings in Santa Monica of the newest in gas-fired household conveniences. The interior has been entirely remodeled. The customers' room or reception office is more than double the size of the one in use before the building was remodeled. Leading to the second floor is a Colonial stairway as well as an automatic elevator. Upstairs is an attractively furnished auditorium with an adjoining conference or committee room, which is available at no cost to social, civic, or fraternal organizations in the Bay District for conferences, meetings, luncheons, etc. The auditorium will seat 200 comfortably.

J. C. Gilbert

Adjacent to the auditorium is a model kitchen designed by Ernest Irving Freese, well known kitchen designer. Katherine Rathbone and Mrs. Marguerite Scroggie, her assistant, have their offices on the second floor, which are the center of the district-wide activities of the company's Home Service Department, headed by Miss Rathbone.

Offices of district executives are located on the ground floor just south of the wide corridor which leads to the Colonial stairway.

Commodious quarters are provided in a large room below the street level for a modern display of restaurant and apartment house equipment. Office facilities for the salesmen also are provided on this floor.

During the opening reception, the entire staff of district executives served as an informal reception committee, explaining the activities of various departments and the work they do to serve the people of the community.

The Santa Monica District of Southern Counties Gas Company, which is under J. C. Gilbert's management, includes Santa Monica, Culver City, Ocean Park, Venice, West Los Angeles, Westgate, Palms, Pacific Palisades, and Palisades Del Rey, with a total of 29,592 meters, a capital investment of $4,010,376, a total of 209 employees, and 565 miles of mains.

Oklahoma Utility Leaders Muster 1130 *for* 12th Annual Convention

T. R. Weymouth, 1929 President, Oklahoma Utilities Association

By CRAIG ESPY
Mid-Continent Manager, Western Gas

WITH a record registration of more than 1130, the 12th Annual Convention of the Oklahoma Utilities Association met at Tulsa, March 11, 12 and 13. No previous registration has ever passed the 1100 mark, which makes the 12th convention a notable one.

1930 LEADERS

Officers of the Association, elected on the last day of the convention are as follows:

T. H. Steffens, head of the Sand Springs Home interests, president, succeeding Thomas R. Weymouth, president of the Oklahoma Natural Gas Corporation. S. I. McElhoes, vice-president of the Southwest Light and Power Company was elected first vice-president, with R. J. Bengel, manager of the Southwestern Bell Telephone Company as second vice-president. W. R. Emerson of Oklahoma City was re-elected as treasurer. E. F. McKay was re-elected as manager of the Utilities Association and O. D. Hall as assistant manager.

Gas men had a prominent part on the convention's program, with nationally known leaders of the industry speaking before the general sessions, and also appearing on the Gas Division program. Gas Division meetings were held the first two afternoons of the convention, the third afternoon being given over to a combined general meeting.

Among those who spoke at the general sessions were B. J. Mullaney, president of the American Gas Association, who delivered an address on "What is Ahead of Us." H. C. Morris, chairman of the Natural Gas Department of the American Gas Association brought greetings from the Department; and D. S. Foster, valuation and rate engineer of the Cities Service Gas Company read a paper prepared by F. C. Hamilton, New York, valuation and rate engineer of Henry L. Doherty & Company on the subject, "Law and Economics Dictate Same Rate Forms." W. J. Haganah of the Byllesby Engineering & Management Corporation delivered an address on "Municipal Ownership." He replaced Halford Erickson on the program. Mr. Erickson, who is vice-president in charge of operation for the same company, was unable to attend the Convention.

The gas divisional meetings were better attended than at any previous convention, according to Association executives. Gas Division sessions were of sufficient interest to attract utility men from other divisions who wanted to hear addresses on some particular phase of gas work. E. C. Joullian of the Consolidated Gas Company, Oklahoma City, was chairman of the Gas Division.

Those appearing before the gas sessions were H. C. Morris, president of the Dallas Gas Company, and chairman of the Natural Gas Department, who delivered an address on the "Progress of the Natural Gas Industry." D. A. Sillers, Lone Star Gas Company, Dallas, gave a talk on the Southwestern Gas Measurement Short Course. E. F. Schmidt, Lone Star Gas Company, Dallas, showed a motion picture on "Pipe Line Construction." F. F. Finney, Indian Territory Illuminating Oil Company, Bartlesville, read a paper on the "Operation and Control of Natural Gas Wells; and F. M. Rosenkrans, Gas Service Company, Kansas City, read a paper on "Ways and Means of Promoting Domestic Gas Sales in Natural Gas Territory."

A feature of the second afternoon's program was the showing of a motion picture furnished by Henry L. Doherty & Company on the "Oklahoma City Oil and Gas Field." Among other interesting things this picture showed an oil well fire, and the bringing in of a big gusher in the Oklahoma City field.

B. J. Mullaney, president of the American Gas Association, appeared on the program of the second day bringing greetings from the Association. C. E. Sherburne, Oklahoma Natural Gas Corporation, Oklahoma City, spoke on the topic "Servicing Gas Appliances." C. C. Williams, Kay County Gas Company, Ponca City, read a paper on "Maintaining Service"; and N. D. Holman, Cities Service Gas Company, Bartlesville, addressed the session on the subject "Cleaning of Natural Gas." Lee Morris, Oklahoma Natural Gas Corporation, Tulsa, spoke on "Purchasing Agents' Problems."

H. L. Montgomery, Cities Service Gas Company, Bartlesville, was re-elected for a three-year term as Executive board member, representing the Gas Division, and R. H. Ulrich of the Oklahoma Natural Gas Corporation, Tulsa, was elected as chairman of the Gas Division, succeeding E. C. Joullian.

ACCIDENT PREVENTION FEATURES

The last session of the convention was given over to an accident prevention program, which featured several papers on accident prevention as well as actual demonstrations through first aid contests. The first aid team from the Oklahoma Natural Gas Corporation won first place in the two contests held, one being on "Respiration" and the other on "First Aid Problems."

Gas men elected on the Public Relations Division of the Association were R. J. Daugherty, Cities Service Gas Company, Bartlesville, as chairman, and R. S. McBeth, Oklahoma Natural Gas Corporation, Tulsa, as member of the Board.

Pipe Protection Firms *in* Organization Move

AT the American Petroleum Institute meeting in Chicago in December, 1929, manufacturers considered in an informal way the question of forming an association of manufacturers of materials for protecting underground pipe against corrosion. The informal meeting seemed to unanimously approve this idea, with the result that negotiations were carried on between the leading companies in the industry. These negotiations culminated in a meeting of representatives of 11 of the leading companies in Tulsa, Okla., on March 17.

The result of this meeting was the organization of an association known as the "Underground Pipe Protection Institute." The objects of this organization, as expressed in the Constitution, are to create a medium through which the members may establish authoritative relations with organizations studying the economics of protective coverings, to advance the interests of members and establish friendly relations with the members of other interested technical societies. Encouragement of ethical practices within the industry will be another aim of the Institute.

Officers of the Institute are as follows: President, E. M. Converse, Dearborn Chemical Company, Chicago; vice-president, E. S. Browning, Hill-Hubbell & Company, Division, General Paint Corporation, Chicago; secretary-treasurer, W. H. T. Thornhill, Wailes Dove-Hermiston Corp., New York.

These officers, together with E. V. Rinehardt, of Johns-Manville Corporation, New York, and William H. Kershaw, of The Texas Company, New York, constitute the board of directors.

Companies represented at the organization meeting were the following: Hill-Hubbell & Company, Division, General Paint Corp.; E. I. Du Pont de Nemours & Co., Inc.; McEverlast, Inc., The Barrett Co., Sherwin-Williams Co., Johns-Manville Corp., Dearborn Chemical Co., The Arco Company, Wailes Dove-Hermiston Corp., The Phillip Carey Co., The Texas Company.

B. R. MUIRHEAD NOW TREASURER OF ARKANSAS NATURAL

B. R. Muirhead, formerly assistant treasurer of the Arkansas Natural Gas Corporation, has been named treasurer of that organization. He has been with the company since 1928, coming from the Empire Gas & Fuel Companies of Bartlesville, where he had served for several years.

Mr. Muirhead is a native of Kansas, and a graduate of Washburn College, and took post graduate work at Nebraska University in business administration.

PACIFIC PUBLIC SERVICE MAY BUY WEST SIDE NATURAL

As *Western Gas* goes to press, news reports state that negotiations are under way for the acquisition by Pacific Public Service Company with headquarters in San Francisco, of the West Side Natural Gas Company, serving Taft, Kettleman City, Fellows and Maricopa, California, including about 3900 consumers.

HADDOCK AND ROESLE NOW AT DOHERTY HEADQUARTERS

H. J. Haddock of the Public Service Company of Colorado, and Louis L. Roesle of St. Joseph, Mo., have been transferred to the Customer Ownership Department of Henry L. Doherty & Company, headquarters of which are in New York, N. Y.

H. C. Abell Candidate *for* U.S. Chamber *of* Commerce

THE American Gas Association is sponsoring the nomination of its former president, Harry C. Abell, of New Orleans, La., as a director of the Chamber of Commerce of the United States, to represent the Natural Resources Production Department. Election will take place at the annual meeting of the Chamber, to be held in Washington, D. C.

Harry C. Abell

Mr. Abell has served as a National Councillor in the Chamber. His business connections are many, including: vice-president, Electric Bond & Share Company; vice-president and director, Electric Power & Light Company; president, National Power & Light Company; vice-president, New Orleans Public Service, Inc.; chairman of the boards of the Memphis Power & Light Company, Memphis Street Railway Company, and West Tennessee Power & Light Company, and a director in other companies.

In the affairs of the American Gas Association, Mr. Abell has long been one of its leaders, serving as a director of the Association continuously since 1923, and as chairman and member of many of its important committees. In 1924 he was elected president and was unanimously reelected in 1925. At the present time Mr. Abell is serving as chairman of the Committee on Coordination of Scientific and Marketing Research, which has the correlation of all research conducted by the American Gas Association involving a yearly cost of about $200,000.

In order to insure Mr. Abell's election to a directorship in the United States Chamber of Commerce, it will be necessary to secure the support of many National Councillors representing organization memberships in the Chamber. All public utility executives are being urged to secure the committments of the National Councillors of trade associations and local chambers of commerce, with which they have connection, to support Mr. Abell's candidacy.

SURFACE COMBUSTION, WEBSTER ENGINEERING OPEN S. F. OFFICE

Surface Combustion Company and the Webster Engineer Company combined have opened an office at 447 Sutter Street, Room 521, San Francisco, to directly serve the Pacific Coast.

The office will be in charge of S. T. McAdams, Jr., at the present time. He will have associated with him H. J. Gregg, who has been transferred from the home office of the Surface Combustion Company.

METRIC METAL WORKS ISSUES BROCHURE ON GAS METERS

Metric Metal Works division of the American Meter Co., of Erie, Pa., manufacturer of gas meters for low and high pressure manufactured or natural gas, has brought from the press a booklet on Metric ironcase gas meters. The brochure is illustrated with photographs and drawings showing the various features of construction of the company's line of meters, and carries also tables of specifications and dimensions. Copies may be had by addressing company headquarters.

Natural Gas *for* Omaha Industrial Users

ORGANIZATION of the Missouri Valley Gas Company, which has for its purpose bringing natural gas for industrial use to Omaha, Nebraska, has been announced. D. B. Cogswell, formerly of the Moody-Seagraves interests of Houston, Texas, is president; E. D. Adams and B. A. Hardey are vice-presidents· W. J. Elkins, secretary-treasurer, and W. G. von Gemmingen, consulting engineer. The company is under the control of the Moody-Seagraves interests organized separately from other Moody-Seagraves units. Offices have been established at Omaha· construction of the line is expected to start immediately.

The projected line will originate at Hugoton, in the Stevens county field, and will traverse the state of Kansas, direct to Lincoln, thence to Omaha, a distance of 394 miles. The line will be constructed of 24-inch pipe, and the right of way is reported to be entirely complete. According to the press, contracts have been placed with A. O. Smith Corporation of Milwaukee for immediate delivery of the pipe. There is a possibility that the line will continue to Des Moines, Iowa, and to Minneapolis, Minn., although no definite announcement has been made.

The Missouri Valley Gas Company is making only industrial contacts at the present time in Omaha, as well as other major cities along the route.

No definite action has been taken concerning the granting of a natural gas franchise for the service of gas for domestic purposes in Omaha, several companies having made overtures for such a franchise.

P. G. *and* E.—N. American Co. *in* Important Merger

ANNOUNCEMENT was made on March 31 by A. F. Hockenbeamer, president of the Pacific Gas and Electric Company of San Francisco, that a merger has been completed which brings the Great Western Power Company, the San Joaquin Light and Power Corporation, and various other utilities formerly controlled by the North American Company of New York under the banner of the P. G. and E. All of the North American Company's California interests have been turned over to Pacific Gas and Electric in an exchange of 1,825.000 shares of common stock, involving $650,000,000. The boards of both companies have approved the transaction, and are awaiting the sanction of the California Railroad Commission.

The merger is the largest public utility transaction of its kind to be made in California, and will make the P. G. and E. the third largest public utility in the United States, ranking next to Consolidated Gas Company of New York and the Public Service Corporation of New Jersey in gross revenue and number of customers. The purchase brings the P. G. and E. annual revenue to $87,000,000, and its total of customers to 1,200,000.

The combination will materially strengthen the gas distribution system of the P. G. and E. in the San Joaquin Valley, adding Bakersfield, Selma and Merced. The company recently bought the gas distribution systems at Tracy and Modesto, and has operated gas properties in Fresno and Stockton for years.

North American Company of New York will be the largest single stockholder of Pacific Gas and Electric, owning 32 per cent of the outstanding common stock.

HOUSTON NATURAL GAS COMPANY NAMES NEW OFFICERS

AT the annual meeting of the board of directors of the Houston Natural Gas Company, held recently, W. B. Trammell and Colonel George D. Sears were

W. B. Trammell *Geo. D. Sears*

elected vice-presidents of the company.

Mr. Trammell has been general manager of the company for more than a year, and prior to that served as superintendent. He was the second man employed by the Houston Natural after its organization in 1925, and has been very active in the development and establishment of the company's present system. He is a graduate of Culver Military Academy of the class of 1922, later attending the University of Texas. He was employed by the Houston Oil Company prior to joining the Houston Natural Gas Company.

Colonel Sears is a member of the Harris county, Texas, bar and a partner in the firm of Kennerly, Williams, Lee, Hill and Sears, legal counsellors for the company. He is a graduate of the University of Texas.

Other officials elected for the year are: E. H. Buckner, president; T. M. Kennerly, vice-president; A. H. Kennerly, secretary-treasurer; H. W. Fairbrother, assistant secretary; T. M. Kennerly, general counsel; McDonald Meachum, associate counsel, and Kennerly, Williams, Lee, Hill and Sears, general attorneys.

The board of directors of the company are E. H. Buckner, W. T. Blaine, W. B. Trammell, T. M. Kennerly and D. P. Perkins.

Officers elected by the Gulf Cities Natural Gas Company, an affiliated company with the Houston Natural, serving Goose Creek, Texas City, Freeport and other territory along the Gulf Coast are: David Hannah, president; Frank C. Smith, vice-president; A. H. Kennerly, secretary treasurer; David Hannah, Frank C. Smith, and John S. McCampbell, directors.

PACIFIC PUBLIC SERVICE BUYS THREE NORTHWEST PROPERTIES

Pacific Public Service Company, subsidiary of the Standard Oil Company of California, announces the purchase of the Natural Gas Corporation of Oregon, the Natural Gas Corporation of Washington, and the Natural Gas Corporation of California.

Through the newly acquired properties the Pacific Public Service Company will apply for franchise rights for the service of liquefied petroleum gas.

Economic Aspects *of* Pipe Protection

and in the field will not protect it from damage.

3. Weather conditions may be such that:
   a. Coating will not spread.
   b. Coating will melt and run.
   c. Coating will not harden or dry.
   d. Dust, sand and dirt will be blown onto the first or second coats.

4. Class of labor available may be incompetent to correctly apply coating.

5. Conditions may be such that it is difficult or impossible to keep hot coating at correct temperature.

6. Incompetent, careless or insufficient inspection of work done.

7. Carelessness or lack of training on the part of the foreman.

It is well enough to raise the cry that protective covering should be applied correctly. But the point is, "Is it being applied properly?" If not, can it be applied properly without increasing costs to such an extent that it is too expensive for use? Cost studies and inspection can determine these points. It is not at all improbable that the ultimate result of such studies will indicate that a coating which can be applied easily and even somewhat carelessly will give better actual protection than one which is theoretically better, but extremely difficult to apply properly.

The obvious method of determining actual effective life of protective coverings, has apparently been overlooked on account of its simplicity. This method merely requires that service crews report the condition of pipe covering at each service tap made. No refined classification is necessary. Either the coating has failed or it has not failed. If the pipe is rusty, or pitted, the covering has failed, if not rusted or pitted, the covering has not failed. This information can be obtained and recorded easily. Such reports can readily be summarized, and within a short time, the relative merits of various coverings determined, and the probable extension of the life of the pipe in each class of soil determined.

Before leaving this subject it may be well to consider briefly the cost of protective coverings. Although it is generally recognized that the cost of protective coverings includes elements other than the necessary labor, supervision, overhead and material, some of these costs are enumerated below in order that they may not be overlooked:

1. Cost of paint, wrapping material, etc.
2. Labor and supervision required for cleaning pipe, preparatory to covering.
3. Labor and supervision required for applying coating in yard or in field.
4. Additional costs involved in careful loading, hauling, unloading and stringing yard protected pipe.
5. Additional costs involved in lining, lowering and protecting covered pipe from injury in the field.
6. Additional cost of patching damaged coverings.
7. Costs due to delays caused by waiting for pipe to dry, etc.
8. Cost of inspecting and supervising yard and field work.
9. Carrying and handling charge for protective materials.
10. Cost of making and tabulating field inspections necessary to determine life of pipe and life of covering.
11. Laboratory costs (Soil analyses, paint analyses, pipe analyses, etc.)
12. Cost of compiling statistical records in connection with protected pipe lines.
13. Cost of accounting for and recording cost of various coverings.

(Continued from Page 40)

While it is true that some of the above elements of cost are indeterminate and variable, they are nevertheless chargeable against pipe protection and should be allowed for. Although no detailed study has been made by the writer, experience with similar problems leads him to believe that the "indirect cost" of protective coverings will be at least 25 per cent of the "direct cost," i.e., cost of labor, plus material, plus supervision and overhead.

Let us now assume that there have been determined:

a. Life of unprotected pipe.
b. Life of protected pipe.
c. Cost of unprotected pipe line.
d. Cost of protected pipe line.

We are now ready to proceed with the determination of the maximum permissible expenditure for protective covering. The following formula may be used when possible future pavement charges are not considered:

$$X = \frac{[C \times (S.F.^1 + 8\%)] - [C \times (S.F.^2 + 8\%)]}{(S.F.^2 + 8\%)}$$

When:

X = Permissible expenditure for protective covering.

C = Cost of unprotected main installed, including present paving.

S.F.^{1} = 6% sinking fund rate, expressed in percentage, for probable life of unprotected main.

S.F.^{2}=6% sinking fund rate, expressed in percentage for probable life of protected main.

8% = Assumed rate of return.

The application of this formula may be illustrated as follows:

C = $-,000.00.

S.F.^{1} = 7.587% based on 10-year life, unprotected main.

S.F.^{2} = 4.296% based on 15-year life, protected main.

$$X = \frac{[\$1{,}000\ (7.587\% + 8\%)] - [\$1{,}000\ (4.296\% + 8\%)]}{4.296\% + 8\%} \text{ or } \$267.65$$

Proving this answer as follows:

Cost of unprotected line	$1,000.00
Depreciation Annuity $1,000 at 7.587%	75.87
Return at 8%	80.00
Total Annual Fixed Charges	$ 155.87
Cost of Protected Line	$1,267.65
Depreciation annuity $1,267.65 at 4.296%	54.46
Return $1,267.65 at 8%	101.41
Total Annual Fixed Charges	$ 155.87

Under this condition, we would "break even" and would apparently be justified in spending $267.65 for protective covering.

Although this formula is not at all complicated, the chart shown in Fig. 1 has been prepared and may be used to quickly determine maximum permissible expenditures under varying conditions of pipe life and protective covering effect. It must be remembered that the values obtained are maximum values and that the accuracy of these values is entirely dependent upon the reliability of the estimate of probable life of unprotected pipe and probable number of years that covering will be effective.

Now, if the pipe line is to be laid in a dirt street which is later to be paved it is necessary to determine what additional allowance can be made for protective covering. This may be calculated as follows:

$$X = \frac{\frac{A \times .08 \times E}{P}}{F + G}$$

When:

X = Additional permissible expenditure for protective covering.

A = Cost of replacing pavement.

.08 = Assumed rate of return.

E = Extension of life, in years, due to protective covering.

P = Probable life of protected main.

F = .08.

G = Depreciation annuity rate based on life of protected main.

Illustrating by an example:

Assume—

Cost of paving replacement $200.00
Probable life of unprotected pipe ..... 15 years
Probable life of protected pipe ..... 20 years

$$X = \frac{\frac{\$200 \times .08 \times 5}{20}}{.08 + .02718} = \$37.32$$

Proving:

Depreciation $37.32 at 2.718%	$1.0144
Return $37.32 at 8%	2.9856
Total Annual Charge	$4.0000
Charge for 20 years	80.00
Cost of paving	$200.00
Return at 8% for 5 years	80.00

As in the case of pipe lines when future paving installations are not considered (either because street is already paved, or because it probably will not be paved) it is necessary to remember that the accuracy of results obtained by use of this formula is dependent upon the reliability of the estimate of probable life of unprotected pipe and the estimate of number of years of protection afforded by the protective covering. The results obtained can obviously be no better than the assumption made.

A final and important factor must also be considered before finally determining whether or not the use of protective covering is justified:

If the physical life of pipe extends beyond the probable useful life of the pipe line, no protection is needed and any money spent for such protection is wasted. The one exception is in the case of long pipe lines the salvage value of which is high.

If, for example, the useful life of the pipe line is a given number of years, and the salvage value can be raised by use of protective covering, the maximum permissible expenditure for protective covering would be calculated as follows:

$$X = \frac{A \times .08}{F + G}$$

X = Permissible expenditure.

A = Estimated increase in salvage value.

.08 = Assumed rate of return.

F = .08.

G = 6% sinking fund rate, expressed in per cent based on useful life of the line.

Illustrated as follows:

A=Estimated increase in salvage value —$1,000.

G = 4.296% or 6% sinking fund rate for expected life of 15 years.

$$X = \frac{\$1{,}000 \times .08}{.08 + .04296} \text{ or } \$650.62$$

This is the maximum amount permissible and would result in "breaking even" on recovery of $1,000 additional salvage value.

However, in the ordinary distribution system, consideration of salvage value can usually be overlooked. The main points to be considered are:

a. Probable physical life of unprotected pipe.

b. Probable date of obsolescence or inadequacy of pipe line.

It is customary, with many companies, to lay small mains in sparsely settled territory and later to replace such mains when the territory becomes built up and pressure conditions warrant the replacement. Obviously, if the physical life extends slightly beyond the date at which this class of main is replaced, there is nothing to be gained by protecting the pipe. If, however, the physical life of pipe is such that the main will have to be replaced before it becomes inadequate, the use of protective coverings may well be investigated. In any event, the writer believes that, in most cases, it is unwise to speculate upon the extension of life of pipe lines whose life, when unprotected, exceeds 20 or at the most 25 years. In the rapidly growing communities of the Pacific Coast, 20 or 25 years is a long time to look ahead.

TABLE NO. 1

Nominal Size of Pipe	Assumed Wall Thickness	*Per cent Increase in Wall Thickness For Various Increases in Weight* 10%	25%	50%
1¼ in.	.140 in.	11.14%	28.36%	58.55%
1½ in.	.145 in.	11.00%	27.97%	57.48%
2 in.	.154 in.	10.71%	27.27%	56.17%
3 in.	.216 in.	10.79%	27.27%	55.69%
4 in.	.237 in.	10.63%	26.92%	54.73%
6 in.	.250 in.	10.52%	26.48%	53.56%
8 in.	.259 in.	10.35%	26.02%	52.47%
10 in.	.259 in.	10.27%	25.79%	51.93%
12 in.	.250 in.	10.24%	25.64%	51.56%

Practical Determination of Areas to be Protected and Type of Protective Covering to be used

Assuming that we have arrived at the point where the probable life of unprotected mains, the probable extension of life affected by protective coverings, the cost of protective coverings, and the permissible expenditure for them, are known, we are faced with the problem of specifying protective coatings for certain areas. We must determine where to use protective coverings and where to use bare pipe.

Soil conditions in southern California are extremely variable. One soil may have a decided corrosive effect, while another, only a few hundred yards away may have practically no corrosive effect upon pipe. It is manifestly impractical to specify a certain protective covering for each service laid, or each block of main installed. To meet that condition two courses are open:

a. Protect all pipe, in a uniform manner, in all districts.

b. Protect pipe only in those districts where protection is economical.

To protect all pipe is economically unsound, for two reasons: First, if only one-half of the pipe really requires protection, the money spent in protecting the other half is wasted; Second, where comparatively inexpensive protective covering is used on all pipe, the pipe which really needs protection is inadequately protected.

Obviously, the logical thing to do is to spend more money on the pipe which requires protection, and to spend no money on that which does not require protection. There is, of course, nothing new about this idea. The problem lies in its successful application in practice.

By use of corrosion measurements heretofore referred to, it will be possible to outline certain comparatively large districts in which protection is required, and others in which none is required. A third grouping would be those districts in which soil conditions are unusually unfavorable. By co-relating field measurements of corrosion with laboratory analysis of soils, it will be possible to predict the probable action of soils in districts where no mains now exist.

These "corrosion" districts should be very clearly defined and in order to avoid undue construction expense, be quite large in extent. The average corrosive action of soils in each district, having been determined, would be used as a guide in deciding whether or not to use protective covering. For example, assume that a district is 50 square miles in extent, and that the soil conditions within the district are about as follows:

Highly corrosive soil, in which life of unprotected pipe is 10 years....10 sq. mi.

Moderately corrosive soil, in which life of unprotected pipe is 25 years .....40 sq. mi.

50 sq. mi.

Placing a nominal value of $1,000 per square mile on pipe lines in this area, and assuming that the use of protective covering will prolong the life of pipe for five years in the corrosive area and seven years in the non-corrosive area, referring to Fig. 1 we find that the permissible expenditure for protective covering is as follows:

Permissible expenditure, bad soil, $10,000 at 26.8%.....$2,680.00

Permissible expenditure, good soil, $40,000 at 10.4%..... 4,160.00

Total.....$6,840.00

Since $6,840 represents 13.7 per cent of $50,000 we would be able to spend about 13.7c per foot in protecting 4-incn main which costs about $1 per foot. This would appear reasonable for this size main. Two-inch main at 50c per foot would call for about 6.8c per foot for protective covering, which also appears reasonable. If, however, the 10 square miles of bad soil were all in one location within this district of 50 square miles, it would obviously be better to protect only that area, and apply no protective covering whatever to the remaining 40 square miles. If the bad soil was scattered throughout the 50 square miles, it would probably pay to protect all pipe, although, as stated before, the extension of life beyond 25 years is of doubtful economic value.

At present, knowing as little as we do about the practical effect of protective coverings, the wisdom of protecting pipe under the above assumed conditions would be open

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to question. In the writer's opinion, for a given expenditure of money more could be gained by using pipe having additional wall thickness, as the virtual qualities of steel are definitely known. This phase of the problem will be given further attention in due course.

From the foregoing it may be concluded that the first logical step in the solution of this problem will be to eliminate at once, those districts in which it is obvious that pipe protection is not required. This permits the concentration of our efforts and money, on protection of pipe where protection is required, and eliminates the waste of money on protection that is not needed.

Major Criticism of Present Procedure

Thus far, protection against corrosion has taken the form of a large scale and costly experiment. An experiment, in its very nature, involves the collection and interpretation of data. While it is true that extensive laboratory data have been collected and interpreted, the data which should have been made available by this large scale and costly experiment in the field have not been collected and consequently their interpretation has not been possible.

As a matter of fact, the writer doubts that even the footage, location, and date of installation of pipe protected by various means during the past few years could be determined without an extensive search through many records. As to the practical effect of such coverings as have been used, the absence of data is conspicuous. This is a mere statement of unfortunate fact. The writer, being an engineer and one-time chemist, has a wholesome respect for laboratory experimentation, but at the same time wishes to emphasize the superior importance of data covering practical field results.

Relation of Protective Coverings to Wall Thickness

It is obvious that a protective covering which actually protects pipe for a period of years will permit of a reduction of wall thickness of pipe, especially in the smaller sizes. Until more definite information regarding the effectiveness of protective coverings is available, there is little to be gained in speculating upon the reduction of the permissible wall thickness of pipe. On the contrary, there is reason to believe that one of the most effective means for prolonging the life of pipe would be that of increasing the wall thickness, especially in the smaller sizes of pipe. For a given percentage increase in weight per foot of pipe, the increase in wall thickness will vary with the diameter of the pipe and the original wall thickness, provided the added metal is placed on the inside of the pipe, leaving the outside diameter the same. This is illustrated in Table No. 1.

Although the above table indicates that the increase in wall thickness is not directly proportional to the increase in weight of the pipe, for the purpose of this discussion it will be assumed that it is. It will also be assumed that the increase in cost per foot, for each size of pipe will be directly proportional to weight per foot.

Although there has been some question raised as to the character of rate of corrosion, some claiming that corrosion rate is accelerative and some claiming that the rate decreases as time goes on, the writer is of the opinion that, in the present state of our knowledge of this subject, it is proper to assume that corrosion rate is constant. In other words, if a bare pipe has corroded half way through in 10 years, it is reasonable to suppose that it will be corroded entirely through in 20 years.

Under these assumptions, a study has been made of the effect of increased wall thickness, in extending the life of pipe, under various conditions. The percentage increase in weight, and consequent increase in cost which must be met in order to extend the life of pipe for a given number of years are dependent upon the life of the pipe which is given increased weight. For example, a pipe which would normally last 10 years would require a 100 per cent increase in weight in order to last 20 years, whereas a pipe whose normal life is 20 years would only have to be increased 50 per cent in weight in order to last 30 years. In order to determine the points at which the use of protective covering is cheaper than the method of increasing wall thickness of pipe, two charts (Figs. 2 and 3) have been prepared, one for 1¼-inch and one for 12-inch pipe.

By following the curve for "Required Extension of Life, in Years," to its intersection with the vertical line passing through the probable life of unprotected pipe, the cost of pipe of which the life will be extended the required number of years by increase in wall thickness may be found.

As an example, assume that 1¼-inch pipe will have a normal life of 15 years. We wish to extend this life to 20 years. Following the 5-year curve to its intersection with the 15-year vertical lines, we read 12c on the left hand scale; 12c would be the cost of pipe whose wall thickness had been increased enough to extend its life from 15 years to 20 years.

The cost of protecting 1¼-inch pipe has been found to be about 4½c per lineal foot, the cost of pipe alone is 9c or total cost is 13½c per foot. Then, under these condi-

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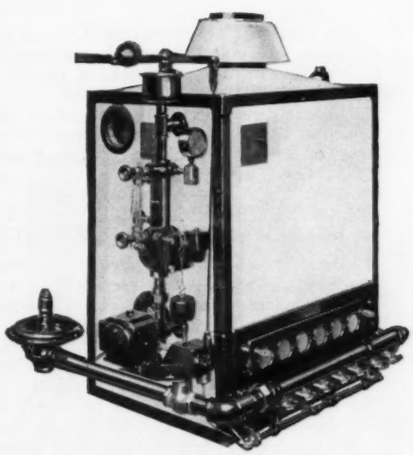

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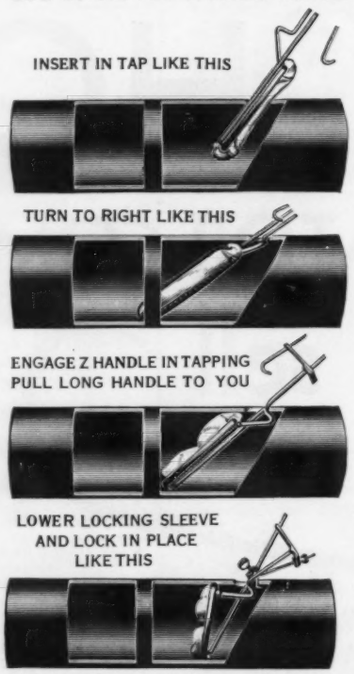
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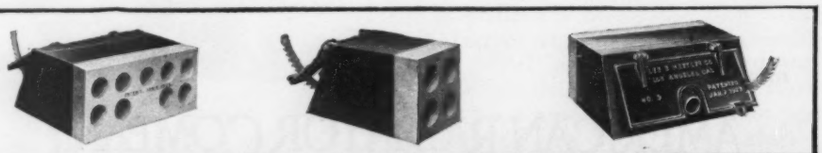

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tions, even assuming that the protective covering will be effective for five years, we find that it would be cheaper by 1½c per foot to increase the wall thickness of the pipe. If, however, the protective covering was effective for 10 years, its cost would be less than that of heavier pipe, which, from the curve, would cost 15c per foot, or 1½c more. It is doubtful, however, that protective covering under the assumed conditions, could be depended upon for as as much as 10 years.

Referring to the chart for 12-inch pipe, (Fig. 3), and assuming the same conditions, we find that the cost of heavier pipe would be about $1.70 per foot, against $1.50 for the protected pipe. In this case, if the protective covering were good for five years protection, it would be cheaper to protect the pipe than it would be to increase its weight.

Consideration of these two extremes in sizes of pipe reveals the fact that, for sizes under, say 6-inch, there are a great many cases where it is far more economical to increase the weight of pipe rather than to apply protective coverings. In fact, under all conditions when the life of pipe 3-inch and under is over 15 years, an increase in pipe wall thickness will afford cheaper and more positive protection than will the application of protective coatings now used. It follows that to apply protective coverings on service pipe whose life is over 10 years is wasteful in comparison with increasing the wall thickness of such pipe.

In view of the uncertain results which may be expected from the use of protective coverings, and considering the definite value of increasing wall thickness of the smaller sizes of pipes, the writer recommends that this neglected aspect of the corrosion problem be given serious study.

With reference to larger sizes of pipe lines, examination of the charts will indicate that little can economically be accompished by increasing wall thicknesses, provided adequate protective coverings can be applied at a reasonable cost.

SOUTHERN UNION GAS CO. GETS ALBUQUERQUE, N. M., FRANCHISE

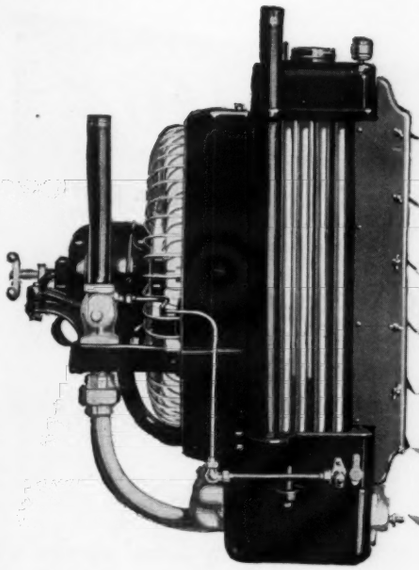
The Southern Union Gas Company of Dallas, Texas, has been granted a gas franchise at Albuquerque, New Mexico, subject to ratification by vote on April 10. The company plans to begin at once the construction of a 12-inch pipe line from northwestern New Mexico to serve Albuquerque and Santa Fe, the latter city having granted a franchise previously.

The line will be approximately 175 miles in length and will originate in the San Juan Basin near Farmington. About 15,000 consumers will be served by the line.

The gas company has opened offices in the Sunshine Building at Albuquerque. Walter Reid is general manager of the Southern Union Gas Company.

INLAND EMPIRE GAS CO. WANTS TO EXERCISE FRANCHISE RIGHTS

Inland Empire Gas Company, having its headquarters at Los Angeles, California, has applied to the State Railroad Commission for a certificate of public convenience and necessity to supply gas in the cities of Calipatria and Niland, in Imperial County, where it has applied for franchises. It is the intention of the company to supply these cities,as well as Holtville, El Centro, Imperial, Brawley, Heber, Calexico, and adjacent territory with liquefied petroleum gas. A certificate has already been granted by the commission for the service of manufactured gas in El Centro, Imperial, Brawley, Heber and Calexico.



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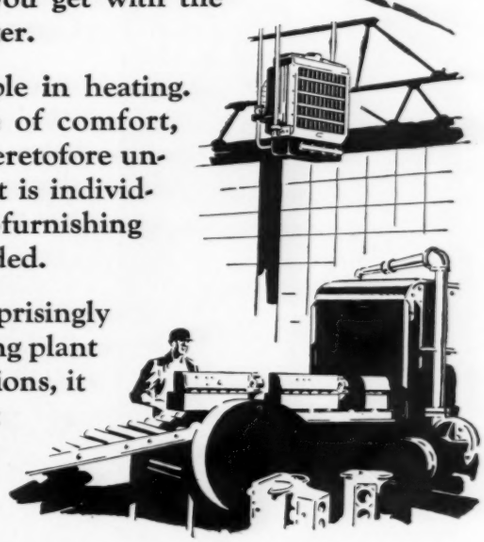

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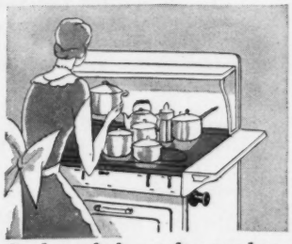

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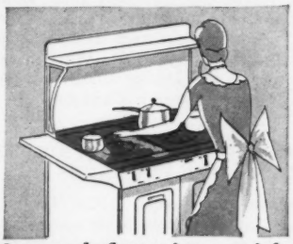

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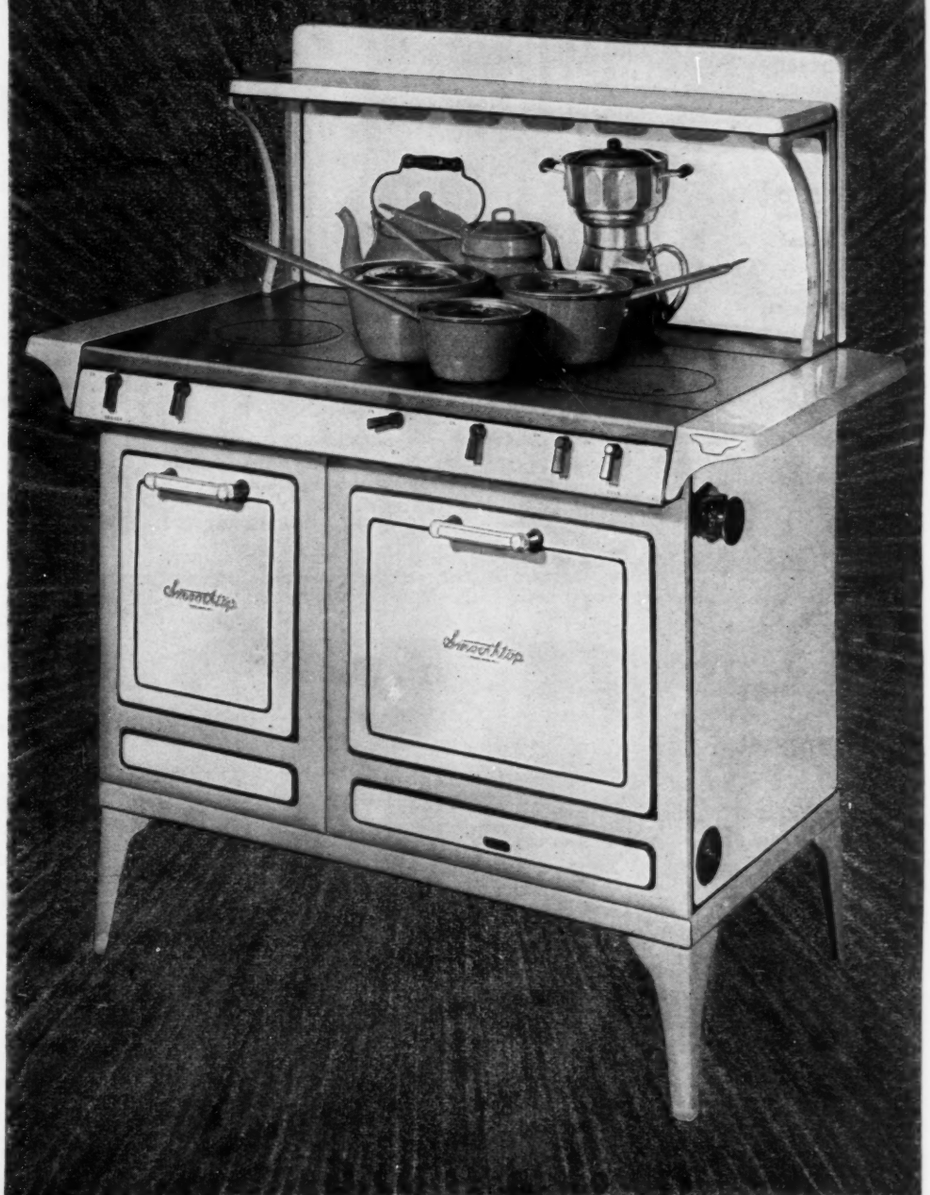
Heat from one of its burners keeps the whole meal steaming hot while waiting to be served.



NO other range offers features as attractive; 4 definite heat zones... speed-spots, busy-boiling, simmering and warming zones; a broad top with every square inch actual cooking surface; evenly heated oven, heat regulator and time chart; automatic self-lighting burners; insulated oven optional.

Smoothtop

GAS RANGE

CAPTURES THE FLAVOR . . . FREES THE COOK

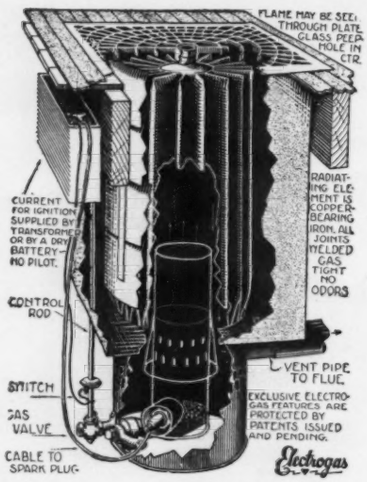
Electrogas

FLOOR FURNACES

The original electrically ignited furnace.

Hollow, streamlined fins offer unusual efficiency.

Fool-proof


FLAME MAY BE SEEN THROUGH PLATE GLASS PEEP HOLE IN CTR.
RADIATING ELEMENT IS COPPER-BEARING IRON. ALL JOINTS WELDED GAS TIGHT NO ODORS
CURRENT FOR IGNITION SUPPLIED BY TRANSFORMER OR BY A DRY BATTERY—NO PILOT.
CONTROL ROD
VENT PIPE TO FLUE
SWITCH
GAS VALVE
EXCLUSIVE ELECTRO-GAS FEATURES ARE PROTECTED BY PATENTS ISSUED AND PENDING.
CABLE TO SPARK PLUG
Electrogas

available in four sizes:
20,000 BTU
25,000 „
30,000 „
40,000 „
also in Cabinet type.

Electrogas, now in its tenth year, has won a reputation for efficiency, freedom from servicing, and all-around satisfaction which is second to none. It will pay you to handle this remarkable appliance.

ELECTROGAS FURNACE CO., Rialto Bldg., San Francisco

GAS BURNERS

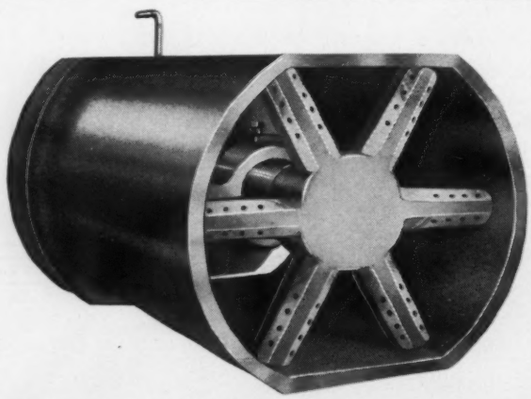
For

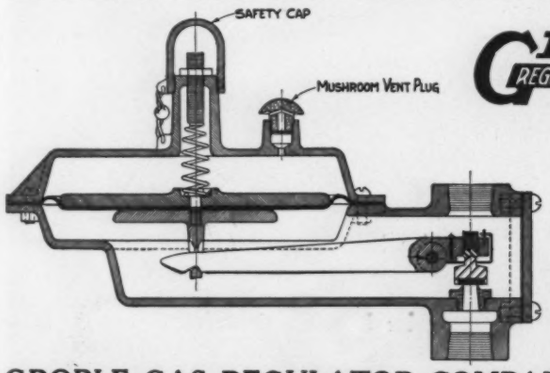
ALL INDUSTRIAL PURPOSES

JOHN ZINK CO.
Oklahoma Natural Gas Bldg.
Phone 4-9838
TULSA, OKLAHOMA

★

Flame Burners
Short Flame Burners
Flameless Burners





GROBLE REGULATORS & GOVERNORS

The Groble No. 1 Service Regulator with or without Dead Weight Safety Valve, made with ¾", 1" and 1¼" Inlet and Outlet Connections.

GROBLE GAS REGULATOR COMPANY, Anderson, Ind.

P. G. AND E. SAFETY COMMITTEE RESUSCITATES AGED WOMAN

Members of the Central Safety Committee of the Pacific Gas and Electric Company of San Francisco, California, recently responded to a call for resuscitation of a 90-year-old woman. On arrival the men were told that it was too late, that the patient had died, but permission was granted to use the inhalator and to render artificial respiration. In 20 minutes the patient was breathing normally and on the following day was enjoying her usual good health.

OKLAHOMA SPEAKERS' BUREAU ACTIVE IN 1929

All previous records of the Oklahoma Speakers' Bureau were broken with totals for the year ending March 1, 1930. A total of 5,484 talks, contacts and plant visits had an audience of approximately 773,000, as compared with 4,851 talks, contacts and plant visits with an audience of 726,405 in 1928. E. F. McKay is manager of the Bureau.

DALLAS JUNIOR C. OF C. HEARS TALK ON GAS TRANSPORTATION

E. F. Schmidt, general superintendent of the Lone Star Gas Company, recently gave an address before the Dallas Junior Chamber of Commerce of Dallas, Texas, on the methods of gas transportation and the problems encountered. George W. Martin, purchasing agent for the Dallas Gas Company, is a director of the Junior Chamber.

FOX FURNACE CO. TO DISTRIBUTE PAYNE GAS FURNACES

Fox Furnace Company, 1123 Harrison Street, San Francisco, has been named distributor of Payne gas furnaces, manufactured by the Payne Furnace & Supply Co. Inc., of Beverly Hills, California. The Fox Furnace Company is a sales subsidiary of the American Radiator and Standard Sanitary Corporation.

J. M. BRUNS, OF BARBER-GREEN CO., ATTENDS EXPOSITION

J. M. Bruns, district manager for the Barber-Green Company of Aurora, Illinois, manufacturer of belt conveyors, self feeding bucket loaders, ditchers and feeders, was on the Pacific Coast during March. While in Los Angeles he attended the Oil Equipment and Engineering Exposition.

MODESTO GAS COMPANY REPORTS OPERATING REVENUE

Modesto Gas Company, of Modesto, California, reports a gross operating revenue of $200,036.47 for 1929. Net operating revenue amounted to $71,781.65 for 1929 after deductions, as compared with $72,770.86 for 1928.

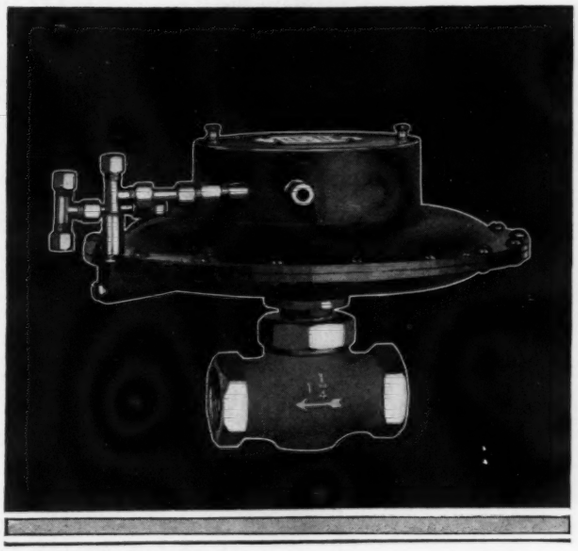
TRACEY TILLOTSON, MUNICIPAL GAS CO. FOREMAN, DIES

Tracey H. Tillotson, plant foreman for the Municipal Gas Company at Denison, Texas, died in February, following an operation. Mr. Tillotson has been with the company for approximately 20 years.

NATURAL GAS LINE TO BARNWELL ALBERTA IS REPORTED

Canadian Western Natural Gas Light Heat & Power Company plans to extend its line to Barnwell, in Southern Alberta, according to recent news dispatches.

Sure, Dependable, Control *for* Gas-Fired Equipment



The No. 610 Electric Diaphragm Gas Valve reliably controls gas flow.

USED in conjunction with a room thermostat and gas limit control the 610 Electric Diaphragm Gas Valve provides accurate, reliable control of all gas-fired equipment—industrial and domestic heating plants, or electric type and industrial ovens. Should electric power fail it operates automatically under direction of the gas-type limit control. Or it can be operated by hand during power failure.

This dependable valve operates from gas pressure built up under the leather diaphragm. Its special features include a leather diaphragm specially treated to resist impurities in the gas—a gas tight seat—elimination of small leak ports—and ability to operate on low pressure. Due to its sturdy structure, it operates reliably, requiring no service or attention.

The 610 valve operates on 110 V. 60 C. A. C. current with a 20 volt secondary transformer which is outside the case. Other models for different cycles and voltages are available.

The 610 Electric Diaphragm Gas Valve is an important part of Time-O-Stat's famous line of automatic controls . . . All have been perfected in Time-O-Stat's research laboratories. Together they form the most complete line of automatic controls in the gas industry.

Our engineering department is always at your service to work out any individual control problem . . . For full information on these products — write or wire us today.

TIME-O-STAT AUTOMATIC CONTROLS

Branch Offices and Exclusive Distributors in all principal cities of the United States.

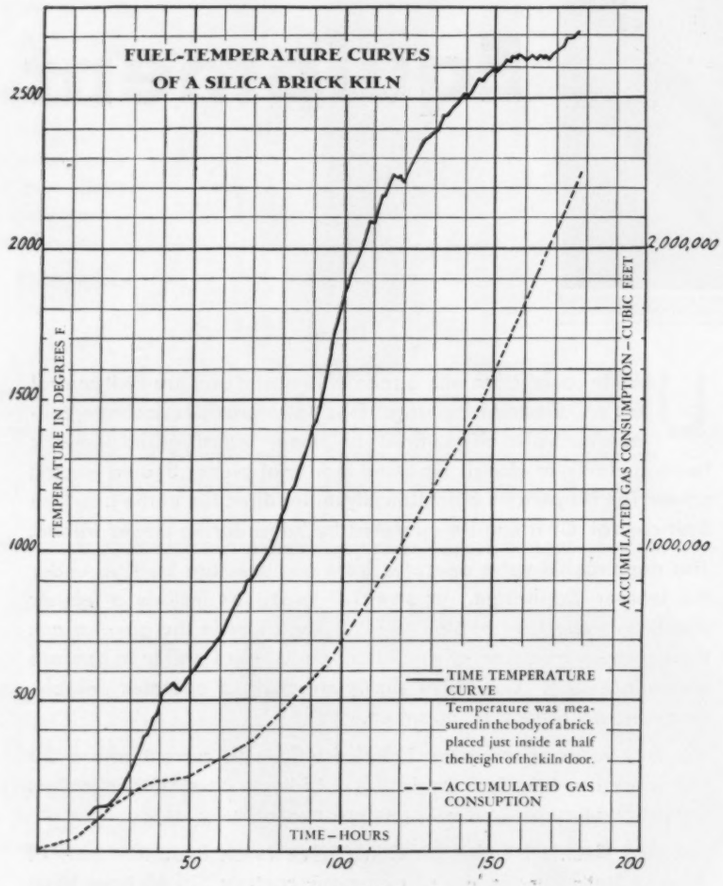
Canadian Distributors
Toronto and Montreal

TIME-O-STAT CONTROLS COMPANY
ELKHART, INDIANA

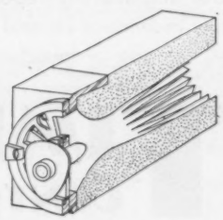
Manufacturers of AUTOMATIC CONTROLS *for Oil Burners — Gas Burners — Coal Burners — Electric Refrigerators — Furnace Fans — Mechanical Stokers — Industrial Ovens — Ice Machines — Unit Heaters . . . . . also of Sign Flashers — Mercury Switches — Electric Heaters — Corrugated Metal Bellows.*

Brick Manufactures
find

HIGH TEMPERATURES EASY WITH D F C GAS BURNERS



Bringing a load of 75,000 silica brick to **temperatures in excess of 2,700° F.** in standard burning time presented no difficulties to the twenty DFC high temperature atmospheric gas burners used. Note the **steady** temperature curve, proving the absolute control provided by DFC burners. This record was made by a large Western silica brick manufacturer—a satisfied customer for the DFC line of burners.



Write today for data and prices on DFC gas burners

The Denver Fire Clay Company

DENVER, COLO., U. S. A.

Branches at Salt Lake City, El Paso, and New York

NATURAL GASOLINE ASS'N. OF AMER. TO HOLD SESSION MAY 20-22

The annual meeting of the Natural Gasoline Association of America will be held at Tulsa, Oklahoma, on May 20, 21 and 22. Headquarters for the convention will be the Mayo Hotel, according to Ray Miller, secretary.

The committee in charge of preparing the program is headed by S. S. Smith, of the Shell Petroleum Corporation, with the following members: F. E. Rice, Phillips Petroleum Company; Emby Kaye, Skelly Oil Company; and R. E. Beckley, Standard Gasoline Company.

CONFERENCES ANNOUNCED BY NATIONAL SAFETY COUNCIL

The Public Utilities Section of the National Safety Council announces the scheduling of several regional conferences to be held during April and May. Among the cities named to act as host to these meetings are: Dallas, Texas, the session to be held April 25; San Francisco, California, the meetings to convene on May 14, 15, and 16; and Omaha, Nebraska, dates for which have not been announced. Kansas City, Missouri, was meeting place of a regional conference on March 24 and 25.

B. T. UTOPIAN CLUB ROOMS OPEN FOR SOCIAL USES

Stuart Francis has been named custodian of the club room of the B. T. Utopian Club, employee organization of Lone Star Gas Company, and members are encouraged to drop in evenings for dancing and cards. A new combination radio and victrola has been purchased, and Mr. Francis plans to assist in arranging parties for bridge or dancing for members.

MONT. UTILITIES CONSOLIDATES WITH BOWDOIN COMPANY

Announcement was recently made through the press of the consolidation of the Montana Utilities Service Company and the Bowdoin Utilities, a subsidiary of the Montana-Dakota Power Company. Bowdoin Utilities Company has been distributing gas at Malta and Glasgow, and the Montana Utilities Company is distributor at Saco, Hinsdale and Glasgow.

STAND-BY GAS SERVICE FOR NEBRASKA TOWNS

A Nashville, Kansas, to Lewis, Kansas, gas line has been completed, tying in at Nashville to the 16-inch line from the Medicine Lodge field to Grand Island, Nabraska. Gas will not be turned in through the new line, according to report, unless it is necessary to augment the supply of gas received from Bison and Lewis gas fields.

SERVICE BUILDING FOR SAN DIEGO CONSOL. NEARLY COMPLETE

A new service building is being constructed by the San Diego Consolidated Gas and Electric Corporation, and is expected to be completed in the near future. One feature of interest is the auditorium for employee gatherings. The building is to be four stories in height, and will house various units of the service departments.

E. M. KEYTE, PRODUCTION SUPT. AT OTTAWA, KAN., DIES

Announcement has been made of the death on February 15 of Earl McKinley Keyte, of Ottawa, Kan., production superintendent for the natural gas division of the Ottawa district of the Cities Service Gas Company.

Why not enjoy the Convenience of
Natural Gas
for heating your home?
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed
by Californians
Why
Natural Gas
is a safe and healthful fuel for cooking, water heating, and care-free house heating
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed
by Californians

Come...*join the band!*

The introduction of Natural Gas creates an immense new market for gas-fired heating appliances.

Consequently, this Company is leaving no stone unturned in an effort to properly inform every one of its consumers of the many advantages in using gas-fired appliances, **now.** Above, and reproduced in small size, are two of the current advertisements—presenting some of the specific advantages of Natural Gas. We are telling **your** prospects for heating equipment that—Natural Gas costs less to use than any other fuel, it is convenient, clean, healthful, and safe.

People are going to DEMAND gas-fired heating equipment. Why not cater to the "wants" of the people and stress the sale of heating equipment that burns Natural Gas?

The advertising programs sponsored by this Company in the past have proved to be of great benefit to all those working in harmony with such a program.

PACIFIC GAS AND ELECTRIC COMPANY

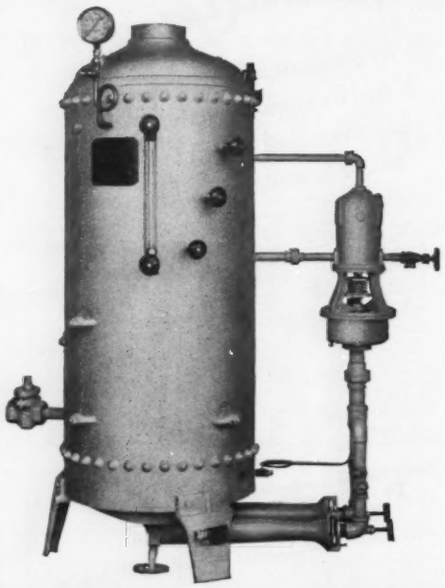
P·G·and E·

Owned · Operated · Managed

by Californians

Automatic Gas Fired Boilers

LATTNER



All Sizes from ½ to 30 H. P.

P. M. LATTNER MANUFACTURING CO.

Factory
516 12th Avenue
Cedar Rapids, Iowa

Warehouse Distributor
2646 South Hill Street
Los Angeles, California

A Heater that Will Deliver a Gallon of Hot Water for Every *1 Foot of Natural Gas.*

THE heater is finished in lustrous enamel.

300-lb. test copper-bearing Steel tank.

New Efficient Insulating Material.

Safety Pilot.

Combination Safety and drain valve.

2 sizes: 25 gal.—40 gal.

Pittsburg Monarch Automatic Storage Water Heater

Made in 2 Sizes
25 Gallons—40 Gallons

Pittsburg Water Heater Company

Offices at:

478 Sutter St.
San Francisco

2010 Jackson St.
Dallas

242 So. Western Ave.
Los Angeles

WOMEN' COMMITTEE OF COAST COUNTIES IS ACTIVE

At a recent meeting of the employees of the Coast Counties Gas and Electric Company held at Santa Cruz, California, the Women's Committee of the Company put on a skit entitled "Facts and Figures," depicting the evolution of the business girl during the past 50 years.

At the February meeting of the Women's Committee, each member contributed suggestions on how to improve the meetings during the coming year. Plans are under way for the annual "Birthday" celebration of the committee, to be held in April.

MISSOURI-KANSAS PIPE LINE CO. MAKES SURVEY IN MID-WEST

The geological firm of Brokaw, Dixon, Garner & McKee of New York is conducting a survey of the natural gas market possibilities in the region embracing Oklahoma, Nebraska, Iowa, South Dakota and Minnesota, on behalf of the Missouri-Kansas Pipe Line Company, according to press reports.

The company is said to be investigating the proposition of laying a gas line from Texas gas fields to Minneapolis.

LEO JOLLEY LEAVES POSITION WITH STAMFORD AND WESTERN

Leo Jolley, formerly general manager of the Stamford & Western Gas Company of Stamford, Texas, resigned his position, effective March 1, to become associated with the Century Stove & Mfg. Co., as a special sales representative attached to the Western branch of the company at Kansas City. His territory will include Texas, Louisiana, Arkansas, Colorado and Utah.

WEST COAST GAS AND FUEL CO. ASKS FRANCHISE PERMITS

West Coast Gas and Fuel Company, Edward Schary president, has applied to the California Railroad Commission for permission to exercise franchise rights which it contemplates obtaining from a score or more of central and northern California towns.

It is proposed by the applicant to store liquefied petroleum gas in plants at convenient points for the service of these communities.

AMERICAN GAS PRODUCTS CORP. MOVES TO CHRYSLER BUILDING

The American Gas Products Corporation, manufacturer of gas heating appliances, and exclusive distributor of Ideal Gas Boilers, manufactured by the American Radiator Company, has moved its general offices to the Chrysler Building, New York City. The factory has been moved to Belleville, N. J.

UNITED CARBON COMPANY MAKES 94,213,894 POUNDS IN 1929

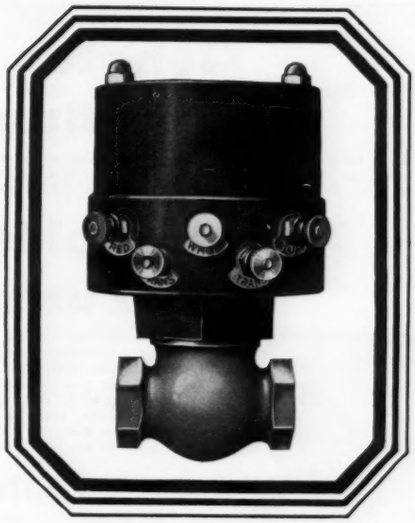
A total of 94,213,894 pounds of carbon black were manufactured by the United Carbon Company during 1929, 60,524,301 pounds of which were produced at the company's plants in Texas.

PORTLAND GAS AND COKE CO. ASKS LEBANON FRANCHISE

Portland Gas and Coke Company, seeking franchises in Albany and Corvallis, Oregon, has also asked for a franchise for the service of natural gas in Lebanon, Oregon.

TRYON, OKLA., GRANTS FRANCHISE TO R. M. TUTTLE

Tryon in Lincoln county, Oklahoma, has voted to grant a gas franchise to R. M. Tuttle of Cushing.



The Teeple Valve is built in standard small sizes (½ inch, ¾ inch, 1 inch) single capacity per size, with unrestricted openings.

SERVICE TROUBLES END

when Teeple Gas Valves are on the job

THE surest way to keep service calls *down* and satisfaction *up* is to equip your gas heating appliances with the Teeple Valve.

No need to have service men in every town to take care of the Teeple valve. Positive induction motor drive (no brushes or commutator) eliminates the sensitive balance of parts, which was a necessary evil in valves of yesterday. The low current used by the valve is supplied by any door-bell transformer, regardless of how far away the thermostat may be located. A special transformer is not needed.

Gas pressure may be high, or voltage low, but this valve has reserve power to care for abnormal conditions.

The Teeple valve operates quietly, powerfully, surely. Responsive to every call of the thermostat, it maintains even temperature at any desired point, eliminates unhealthy warming-up and cooling down periods, and makes possible a real saving in the gas bill over hand or push-button control.

If you want more satisfied customers and fewer service calls investigate the Teeple valve. An interesting folder telling the complete story will gladly be mailed on request. L. R. Teeple Company, 540 East 9th Street, Portland, Oregon.

TEEPLE

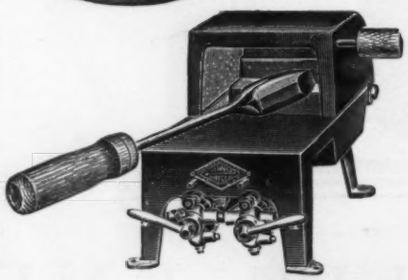
TEEPLE

ELECTRIC GAS VALVE

Johnson Student Bunsen

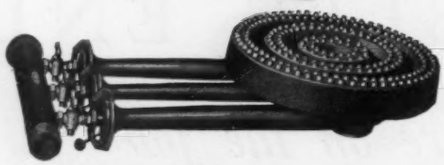
This laboratory Bunsen is simple but very efficient. Neatly finished in whitened nickel. Removable top, shut-off valve, and pilot light. Produces high flame temperature. Write for catalog.

Johnson Soldering Furnaces



The illustration shows the famous Johnson No. 101 Soldering Furnace. It is one of the handiest, stoutest, and most efficient bench furnaces on the market. City gas pressure only is required. Our Free Catalog describes the complete line of Johnson Furnaces. Write for a copy!

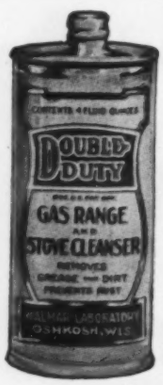
Johnson Gas Burners for Every Use!



The famous Johnson 60BCE Triple Atmospheric Ring Burners lend themselves to a great variety of installations. They may be used singly, in pairs, or in triple. If your needs require special burners, we are prepared to design and build burners to meet those particular needs. Write for catalog showing standard stock burners.

JOHNSON GAS APPLIANCE CO. Cedar Rapids IOWA

Pacific Coast Rep.
C. B. Babcock Co.
135 Bluxome St.
San Francisco, Calif.



ATTENTION! Commercial Members Gas Companies

A Spic and Span gas stove is a credit to the house-wife and can be kept that way by the use of

Removes Grease

DOUBLE DUTY
REG. U.S. PAT. OFF.

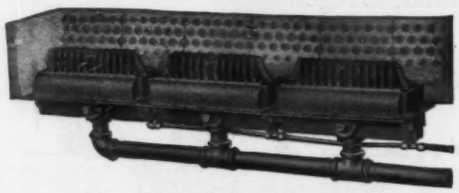
Prevents Rust

GAS RANGE & STOVE CLEANSER

WALMAR LABORATORY Oshkosh, Wisconsin

Western Distributor
C. B. BABCOCK CO., San Francisco, Los Angeles

R. M. C. Gas Burner



Durable Safe Economical

ROTARY MANUFACTURING CO.

5720 Long Beach Avenue Los Angeles, California

PRIZE AWARD FOR SCIENTIFIC WORK IS ANNOUNCED

An annual prize award of $10,000 and a gold medal will be given by Popular Science Monthly under the auspices of Popular Science Institute, a research organization, to the American citizen who has been responsible during the preceding year for the scientific achievement of greatest potential value to the world. The purpose of the award, according to O. B. Capen, president of Popular Science Publishing Company, is to heighten the interest of the American people in scientific accomplishment, and to focus the attention of the public upon scientists who are working without thought of monetary gain. The contest will begin in the autumn of this year.

LARGE GAS INSTALLATION SOLD BY B. C. ELECTRIC

The largest sale contract in the history of the gas department of the British Columbia Electric Power and Gas Company at Vancouver, B. C., has just been signed by E. E. King and R. Carver, two of the sales staff, who were successful in selling a vacuum gas heating system to be installed in the new office of the steamship division of the Canadian National Railway Company. The installation of 64 radiators is valued at $13,000. It is estimated that the gas consumption of this installation will be about $2000 per year.

LOGAN COUNTY GAS TO SERVE MORE ARKANSAS TOWNS

M. W. Greeson of Prescott, Arkansas, plans the construction of a gas line from the Logan county, Arkansas, fields to serve Dardanelle, Paris, Charleston, Branch, Radcliffe, Blue Mountain, Scranton, Subiaco, Ola, Belleville, Magazine, Booneville, and Mena.

Franchises are now being secured in the towns and construction is to be started within six or eight months, it was stated. Dardanelle will be headquarters for the company. Cost of the line is estimated at $500,000.

M. W. Greeson controls gas producing properties in the new Logan county fields.

GAS DISTRIBUTION SYSTEM AT BOOKER, TEXAS, COMPLETE

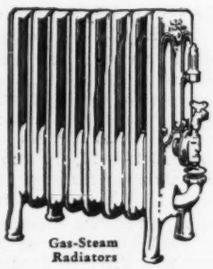
The gas distribution system at Booker, Texas, has been completed and awaits the turning on of natural gas to be served through a gas line originating in the Wheeler county, Texas gas fields. Towns now being served from the line, which was constructed by the Public Service Corporation of Texas, are Perryton, Spearman and Higgins in Texas, and Shattuck, Gage and Fargo in Oklahoma. Headquarters for the Public Service Corporation are in Fort Worth.

WORTHINGTON PUMP HAS NET INCOME OF $2,529,356 FOR 1929

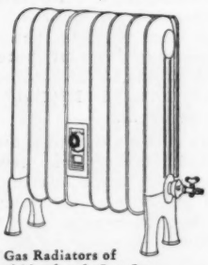
Worthington Pump and Machinery Corporation and subsidiary companies, in a yearly report, list current assets at $17,622,856. The net income of the company was listed at $2,529,356, and surplus at $5,659,169, as of December 31, 1929.

CANADIAN WESTERN NATURAL TO HAVE STATION AT CLARESHOLM

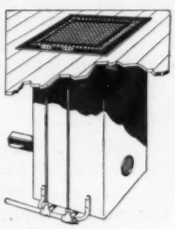
Canadian Western Natural Gas Company of Calgary, Alberta, plans to establish a regulating station and office at Claresholm.



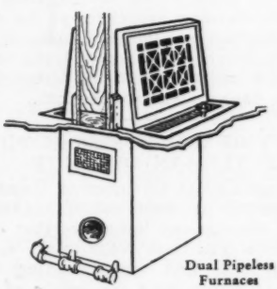
Gas-Steam Radiators



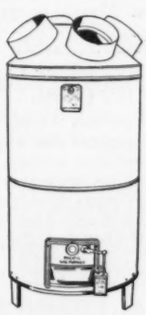
Gas Radiators of Pressed Metal and Cast Iron



Pipeless Floor Furnaces



Dual Pipeless Furnaces



The New Perfected Pacific Gas Unit Furnaces

Recessed Wall Heaters

PACIFIC...

The Right Gas Appliance for Every Gas-Heating Job

THERE'S A LOT of satisfaction, both for you and your customers, in handling a line that is COMPLETE. No matter what kind of job comes up, you can say: "Here's the *right* appliance to fit the need."

A Pacific Gas Agency provides every gas appliance you need, from a single source—the largest and oldest gas-heating organization in the West. You understand one line better than the products of many firms. There is full centralized responsibility. Your guarantee means more because you thoroughly understand the Pacific Guarantee and are working closely with us.

Look over the items briefly described here, then write for full details of our attractive dealer proposition.

Pacific 5-Column Gas-Steam Radiators

The Pacific Gas-Steam Heating System can consist of one unit or a thousand. Each is independent of all others, supplying comfortable steam heat at the turn of a valve. Beautiful 5-column radiators. Instant appeal. Used in finest homes, and institutions.

Pacific Gas Radiators

Use no water. Simple, compact, durable, quick-acting, and economical. Handsome in appearance. The pressed-metal type is for homes, apartments, etc., and the heavy cast iron type is for larger buildings.

Pacific Gas-Unit Furnaces

The perfect warm air heating system. Use as many units as required to provide number of outlets desired. Electric or manual control, or supplied with automatic heat regulator. Long-lasting. Trouble-proof.

Pacific Floor Furnaces

Scientific design, with sealed combustion chamber and outside vent. Heavy cast iron heating dome assures perfect uninterrupted heating service for many years.

Pacific Fireplace Radiant Heaters

Equipped with Pacific New-Feature Burner, which provides complete combustion with any type gas, without need of adjustment. Many sizes, styles and finishes.

Pacific Automatic Water Heaters

Here's the most saleable line of quality water heaters you've ever seen. Both instantaneous and automatic storage types. The latter have center heating flues and outside shell of boiler is also used as heating surface. Efficient, well-insulated, economical, with positive thermostat control. A size and type for every purpose.

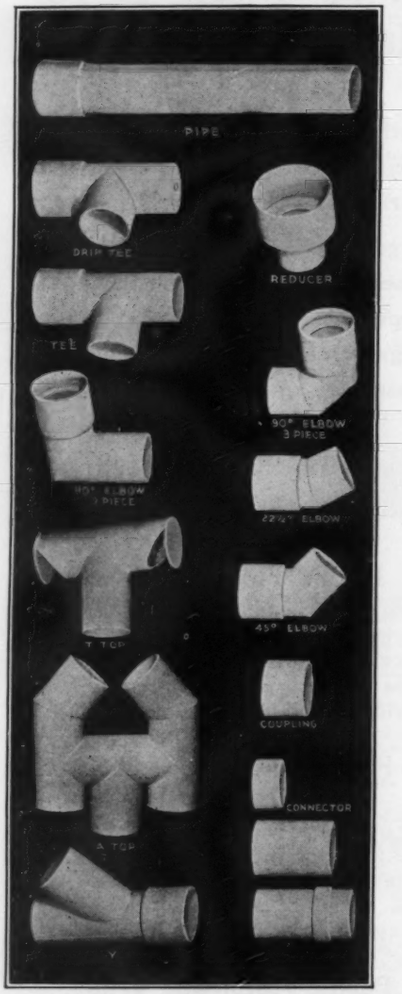
Pacific Gas Radiator Company

Gas Heating **Headquarters**

Roseberry and Walter Sts., Huntington Park, Calif.

Write us about the attractive Pacific Gas Agency proposition for your territory

VITEX



The Light, Durable and Non-Corrosive Gas Vent and Flue Pipe— is easy to Install— Increases Draft, Improves Combustion, and Minimizes Condensation

For Fully Descriptive Catalogue Write To

Plant Rubber & Asbestos Works

537 Brannan Street San Francisco

FORNEY

COMBINATION GAS and OIL BURNERS

For Power Plant and Industrial Uses

Write for Literature and List of Installations

FORNEY COMBUSTION ENGINEERING CO.

305 THOMAS BLDG., DALLAS, TEXAS

UNITED GAS CO. PRODUCTION SHOWS 7.87 PER CENT GAIN

Total volume of natural gas produced by and received by United Gas Company under exclusive gas purchase contracts during 1929 was 46,036,607,000 cubic feet, an increase over the 1928 figures of 7.87 per cent, or about 3,359,911,000 cubic feet according to a statement made at the offices of the company at Houston, Texas.

Of the 46 billion cubic feet produced and received during 1929, as much as 19,570,761,000 cubic feet was directly produced by United Gas Company's subsidiaries. This volume represented an increase of 1,597,922,000 cubic feet, or 8.89 per cent over 1928. Gas purchased under purchase contracts totaled 26,465,846,000 cubic feet, an increase over 1928 of 1,761,989,000 cubic feet, or 7.13 per cent.

United Gas Company sales during 1929 reached 45,656,201,000 cubic feet, an increase over sales made during 1928 of 3,905,764,000 cubic feet, or about 9.36 per cent. The sales movement was divided in 1929 as follows: domestic sales, 4,264,580,000 cubic feet; commercial, 515,049,000 and industrial, 40,876,572,000 cubic feet.

Meters in service throughout the United Gas system at the end of 1929 totaled 85,931, a net increase of 10,748 during the year, or an increase of about 14.3 per cent when compared with the number in service at the close of 1928.

BUREAU OF MINES IN RESEARCH ON LIQUEFIED NATURAL GAS

The United States Bureau of Mines of the Department of Commerce recently issued a report of investigations on "Odor Intensity and Symptoms Produced by Commercial Propane, Butane, Pentane, Hexane and Heptane Vapor." The object of the investigation was to study the warning properties of the volatile hydrocarbons in liquefied natural gas products, to determine whether leaks or escape of the vapors could be detected in advance of dangerous concentrations.

SURVEY OF INDUSTRIES IN THE KETTLEMAN DISTRICT

The Kings County Chamber of Commerce has announced its intention of making a survey of the various industries that could utilize natural gas from wells in the Kettleman Hills area, and of persuading those industries to locate near the source of supply. The secretary of the chamber was instructed early in March to prepare a list of these industries.

ELECTROLUX REFRIGERATOR SALES NAMES DISTRIBUTORS

Electrolux Refrigerator Sales, Inc., Evansville, Indiana, announces the appointment of the following companies to handle the company's products: Carl Latenser Music Co., Atchison, Kansas; Eads Brothers Furniture Co., 410 Garrison Ave., Fort Smith, Ark., and the General Utilities Co., Herington, Kansas.

WYOMING HAS RECORD NATURAL GAS SEND-OUT FOR 1929

Wyoming made a record for natural gas send-out in 1929, with a total of 56,664,383,000 cubic feet, valued at $2,266,575, as compared with 47,356,306,000, valued at $1,890,252 in 1928.

YOUNG PETROLEUMS, LTD., ASKS CASTOR, ALBERTA, FRANCHISE

Young Petroleums, Ltd., of Calgary, Alberta, has applied to the town of Castor for a franchise to serve natural gas in that town.

HEALTH and COMFORT

it's so easy to Sell this appeal

YOU have a wonderful message for every home-dweller.

The American tempo of living suggests leisure, comfort, cleanliness and convenience in the home. The American man doesn't want to be worried with the weekly problem of ash disposal.

The American woman wants to arise in the morning in a warm home. She wants the kiddies to dress in a warm room and come downstairs to a warm dining or living room. She demands emancipation from the drudgery of furnace tending. She wants more leisure to devote to her household duties and to the care of her children. She is open to any reasonable suggestion that will earn for her more time for constructive work. She worries for the health of her family when floors and rooms are cold.

Yours is an unusual opportunity to increase the health and comfort of Mr. and Mrs. Modern Homedweller and thereby render a truly constructive service in your community. And for every home that is gas heated .. the gas load in that home is automatically increased by 1000%. Will you pass this opportunity by unheeded .. or will you fulfill the latent demand for home heating by gas?

Send for the interesting book just published in the interests of greater gas sales, entitled "Sell Health and Comfort". A copy is yours for the asking .. gratis.

ROBERTS CONTROLLED GAS HEATING UNIT

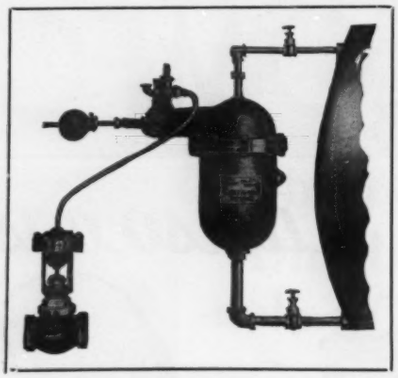
DUPLEX UNIT CONTROL GAS HEATING SYSTEM

ROBERTS-GORDON APPLIANCE CORPORATION

DELAWARE AVENUE AT TUPPER STREET

CURTISS BUILDING BUFFALO, N. Y.

TRADE MARK



CF

Dependable—of course

The Vigilant Liquid Level Regulator, by remote control, is designed to maintain constant oil level in both the absorbing tank and the still, where gasoline is manufactured by absorbing the gasoline in oil and subsequently separating it from the oil by distillation.

This regulator will accommodate itself to any type of absorber or steam still, and maintain a constant oil level under pressure.

More than forty years of successful experience in the manufacture of regulators assure to the purchaser absolute accurate and reliable equipment.

Write for Catalogue

The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes From 1 Inch to 24 Inches; For All Service. 1 oz. up to 2,000 lbs. Pressure to Square Inch.

28-40 Penn Avenue **Pittsburgh, Pa.**

REPRESENTATIVES:

WESTCOTT & GREIS, Inc.
Sales and Service
Dallas — Los Angeles — Tulsa

JNO. W. CRAWFORD
Sales Engineer
1855 Industrial Street Los Angeles

Or Any Jobber

Cheap fuel, easily available is the foundation of Industrial progress. No city ever arose to heights of success, power and achievement without it. Today, Gas (natural or manufactured) may well be said to occupy that unique position.

C. B. BABCOCK CO.

San Francisco Los Angeles

A. F. PISTOR TAKES CHARGE OF INERTOL PLANT AT NEWARK

A. F. Pistor

According to an announcement made by Bernhard W. Mueller, Pacific Coast Representative of the company, A. F. Pistor, Ph. D., of Stuttgart, Germany, has been placed in charge of the factory and research department of Inertol Company, Newark, N. J., manufacturer of Imunol and Inertol.

Mr. Pistor received his doctor's degree from the University of Stuttgart, at Stuttgart, Wurttemberg, Germany.

REPORT OF GAS UTILITY SALES IN JANUARY

The retardation characterizing general business and economic conditions during January was reflected in sales of manufactured gas utilities for the month, which showed an increase of only three percent over the same month of the preceding year, according to Paul Ryan, chief statistician of the American Gas Association. As of January 31, the customers of the reporting companies aggregated 8,919,063, while revenues for the month totalled $34,884,673, an increase of some two per cent over January a year ago.

During January the gas produced by these reporting companies declined by nearly five per cent. The total manufactured and mixed gas produced and purchased for distribution, however, gained 2 per cent, owing largely to an increase of 27 per cent in by-product coke oven gas purchased.

A group of the larger natural gas distributing utilities reported customers aggregating 2,015,834 as of January 31, 1930, while sales of natural gas for the group totalled nearly 23 billion cubic feet during the month, an increase of eight per cent from the same month of the preceding year.

PACIFIC GAS AND ELECTRIC CO. REVENUE SHOWS INCREASE

Pacific Gas and Electric Company of San Francisco reports its 1929 operating revenue at $64,779,455.64, as compared with $57,789,855.62 for 1928. The operating expenses, excluding taxes for 1929, are reported at $30,966,125.44, and for 1928 at $28,781,904.94, leaving net operating revenue of $33,813,330.20 for 1929, and $29,007,950.68 for 1928.

GEORGE HUMPHREY VACATIONING ON PACIFIC COAST

George Humphrey, sales manager for the General Gas Light Company of Kalamazoo, Michigan, with Mrs. Humphrey, is vacationing on the Pacific Coast following a trip through the Panama Canal from New York. Mr. and Mrs. Humphrey are motoring through California.

NATURAL GAS TO BE USED BY FRESNO COUNTY HOSPITAL

Natural gas from the Pacific Gas and Electric Company's mains will be used to heat the Fresno County Hospital at Fresno, California. The contract calls for a three-months trial, and if the new fuel is satisfactory it will be used in all county institutions.

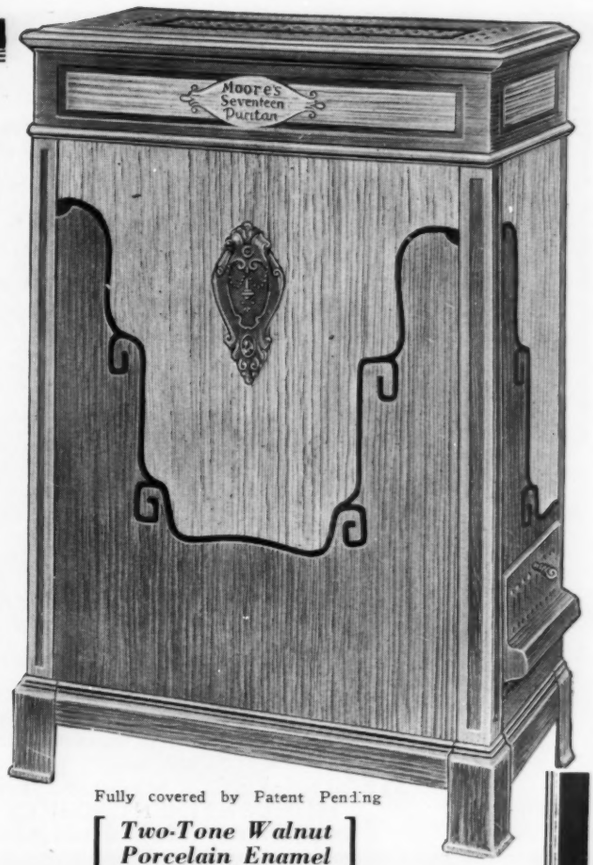
GAS—

the Ideal Fuel— is best used in

Moore's

Warm Air Circulating Gas Heaters

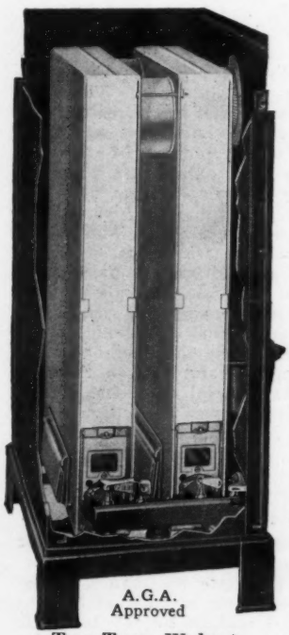
Embodying the most advanced principles of construction, these heaters are designed to harmonize with every modern conception of home furnishings.



Fully covered by Patent Pending

[*Two-Tone Walnut Porcelain Enamel*]

17D Series
105,000 Btu. (Triple Drum)
70,000 Btu. (Double Drum)
35,000 Btu (Single Drum)



A.G.A. Approved

Two-Tone Walnut Porcelain Enamel

11A Series—Vented 20,000 Btu. (Single Drum)
12A Series—Unvented 20,000 Btu. (Single Drum)

IT PAYS TO SELL MOORE QUALITY!

The MOORE Line Offers:

A wide range of sizes and finishes.

An extra measure of beauty, safety and service which breaks down sales resistance.

Freedom from service costs that are so frequent with inferior makes.

A product backed by 73 years of experience in the manufacture of cooking and heating appliances.

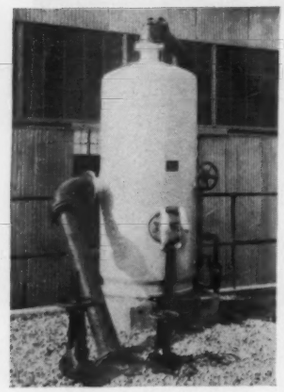
The trend of the buying public is toward quality. Investigate the MOORE Line.

It takes more than a flame and a casing to make a successful gas-fired circulating heater.

MOORE BROTHERS COMPANY

Cooking and Heating Appliances

JOLIET [SINCE 1857] ILLINOIS



MIST-D-FIER on fuel gas line to gas engine compressors of Ventura Fuel Company.

Who Pays For a MIST-D-FIER?

EVERY plant owner pays, whether he has ordered a MIST-D-FIER or not. But the MIST-D-FIER owner pays with a grin, for he knows that this equipment . . . .

Makes for smoother plant operation (shuts out the crude mist—all of it).

Increases gasoline production (keeps the absorption oil clean and functionable).

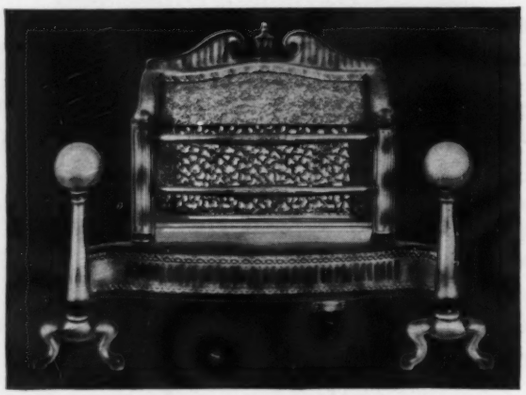
Turns crude mist into a salable product (the strategy that wins).

Own the MIST-D-FIER you are paying for. Get acquainted with it through Bulletin No. 6.

Write for your copy today.

J. A. CAMPBELL CO.
Natural Gas Engineers
CONSULTING DESIGNING CONSTRUCTING
PHONE-416-93
P.O. DRAWER 669
LONG BEACH, CAL.

STEARNS-ROGER MFG. CO., DENVER
MID-CONTINENT AGENCY
Originators of Oil-Froth Absorbers



The Colonial

A model that is proof that fine period design can be manufactured in large volume at surprisingly low prices. List price of 10 element Colonial is $45; 14 element size, $55.

THE GUARDIAN GAS APPLIANCE CO.
1364 East 47th Street Cleveland, O.

in the Cordeveaux finish

Write for complete catalog illustrated in full colors, and price sheet.

Guardian
FIREPLACE AND PORTABLE HEATERS

WALLACE NOW VICE-PRESIDENT OF TIME-O-STAT CONTROLS CO.

A. I. Wallace

Announcement was recently made that A. I. Wallace has been named vice-president in charge of sales of the Time-O-Stat Controls Company of Elkhart, Indiana.

Mr. Wallace has been actively interested in Time-O-Stat Controls for several years, and was instrumental in bringing about the consolidation of the four companies which make up the present organization of the company.

Time-O-Stat Controls Company manufactures a full line of automatic controls and maintains an engineering staff of more than 50 men.

SOUTHERN NATURAL BUILDS LINE TO MERIDIAN, MISS.

CONTRACT for the construction of a natural gas line from a point near Louisville, Mississippi, to Meridian, has been awarded W. S. Bibb of Birmingham, by the Southern Natural Gas Corporation, it was announced in March. The contract involves the expenditure of $400,000. Construction of the line will begin immediately and will be completed on or about June 1. The line will be approximately 60 miles in length. While no announcement has been made, it is possible that communities between Louisville and Meridian will have natural gas available. The distribution of natural gas in Meridian will be through the mains of the Mississippi Service Company, operators of the local company. The steel pipe for this construction has already been ordered. The appropriation necessary for the construction of the line into Meridian is one item on the 1930 construction program for the territory traversed by the Southern Natural Gas Corporation system, which will involve several million dollars. This is the first large lateral line which has been authorized by the natural gas company since the completion of the main transmission system, which is now engaged in supplying natural gas through local distributing companies in many cities of the South between Monroe, Birmingham and east to Atlanta. It is expected that several additional lateral lines into important towns and cities of the southeast will be authorized during this year.

SAN DIEGO CONSOLIDATED HAS NET OPERATING REVENUE OF $3,203,937

San Diego Consolidated Gas and Electric Company, operating in San Diego, California, reports to the State Railroad Commission its 1929 operating revenue at $7,349,935, as compared with $6,860,568 for 1928. The operating expenses, excluding taxes for 1929, are reported at $4,145,997, and for 1928 at $3,847,841, leaving net operating revenue of $3,203,937 for 1929, as compared with $3,012,727 for 1928.

CONSUMPTION OF NATURAL IN ALBERTA SHOWS LARGE GAIN

Natural gas consumed in Alberta during 1929 increased more than 50 per cent, the major part of the supply coming from fields south of Calgary. Total amount consumed in 1929 was 23,225,000,000 cubic feet as compared with 14,198,959,000 in 1928.

POSITIVE CONTROL of the Heating Load

There is no longer a question about the advisability of clock equipped room thermostats, say gas company executives who have studied their way through the whole problem.

Boiled down to essentials, here are the reasons why these men insist on clocks:

(1) Clock thermostats prevent a morning super-peak by bringing on the heating load well before the cooking and hot water demand.

(2) Clock thermostats give the consumer a tangible fuel saving (varying, of course, in each installation).

(3) Clock thermostats give the consumer the completely automatic heating he wants, cool rooms to sleep in, warm rooms to dress in, without the slightest need to tinker with the thermostat.

The first advantage bears directly on your major problem of controlling the heating load. The second and third pay handsome dividends in consumer good will, your strongest salesman of new installations in every neighborhood.

ARTHUR F. ERICKSON COMPANY
Pacific Coast Distributors

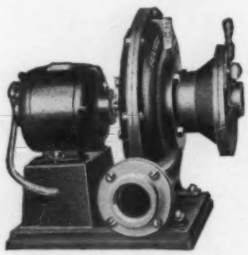
557 Market Street
SAN FRANCISCO, CAL.

Selling Building
PORTLAND, OREGON

Terminal Sales Building
SEATTLE, WASH.

MINNEAPOLIS
HEAT REGULATOR
HONEYWELL

Premix Burners Get Results



Premix Burners for low pressure gas are motor driven mechanical air-gas mixers producing a complete combustion mixture which is delivered to a suitable number and size of Sticktite (flame retention) Nozzles. Automatic control is available if needed.

Ventite Inspirating Burners, in sizes 1" to 6", are recommended for intermediate and high pressure gas where such pressures are obtainable without the expense of compression.

Sticktite (flame retention) Nozzles are suitable for any burner system employing complete combustion mixtures.

Pacific Coast Representative

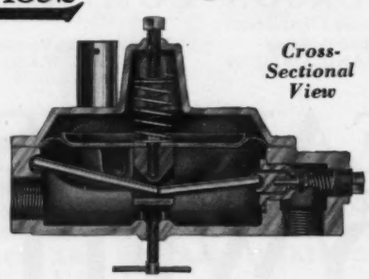
The T. G. ARROWSMITH CO.
661 Howard St.
San Francisco, Calif.

MAXON PREMIX BURNER CO.
INDUSTRIAL FUEL BURNING EQUIPMENT — FOR OIL OR GAS, OR BOTH COMBINED
MUNCIE PREMIX BURNER INDIANA

Reynolds Gas Control Since 1892

Reynolds Little Giant Regulator

Products for all kinds of Pressure Reduction—for either artificial or natural gas.
GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.
REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.
VALVE—Automatic Quick Closing Anti Vacuum.



Cross-Sectional View

Reynolds Gas Regulator Company
Anderson, Indiana

M. D. Gilbert

PITTSBURGH EQUITABLE METER OPENS HOUSTON OFFICE

The Pittsburgh Equitable Meter Company announces the opening of a new branch office in Houston, Texas. M. D. Gilbert, a representative of the company, formerly working from its Dallas office, has been placed in charge.

Warehouse stocks will be carried and so far as possible all orders will be filled in Houston. The address of this new branch is 806 Second National Bank Building.

ARKANSAS NATURAL GAS CORP. ACTIVE IN SAFETY WORK

E. J. Sullivan, who was recently named director of safety for Arkansas Natural Gas Corporation and its subsidiaries, has announced that regular meetings will be held during the coming year of branch chapters of the Arkansas Natural Safety Council at Tullos and Monroe, in Louisiana, and at El Dorado, Little Rock and Malvern in Arkansas, and Texarkana, in Texas.

OPERATING REVENUE OF SO. CAL. GAS CO. IS $6,163,342

Southern California Gas Company, of Los Angeles, Calif., reports to the State Railroad Commission its 1929 operating revenue at $17,295,290, as compared with $16,033,389 for 1928. Operating expenses are reported at $11,131,947, and for 1928 at $9,935,298, leaving net operating revenue of $6,163,342 for 1929, as compared with $6,098,090 for 1928.

TEEPLE CO. PUBLISHES BROCHURE ON MOTORIZED GAS VALVE

L. R. Teeple Company of Portland, Oregon, recently published a new brochure on the company's motorized gas valve. The folder gives a brief history of the development, together with specifications and the 12 salient features of the valve. Three automatic controls for use with the Teeple gas valve are also described in the brochure.

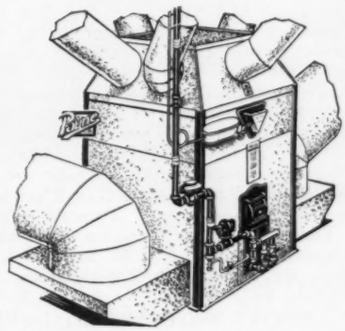
PORTER D. MELLON MAKES TRIP TO BRITISH COLUMBIA

Porter D. Mellon, general superintendent and chief engineer of the Canadian Western Natural Gas, Light, Heat & Power Company, Ltd., of Calgary, recently made a business and vacational trip to Victoria, B. C.

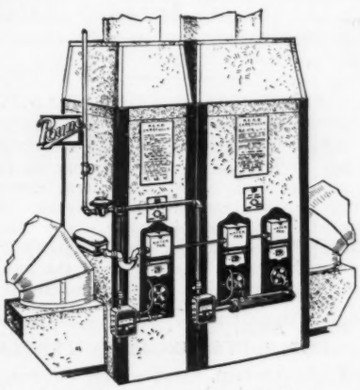
PERKINS-JONES WITHDRAW PETITION FOR FRANCHISE

The Perkins-Jones interests have withdrawn their application for a franchise to serve natural gas in Havre and Chinook, Montana.

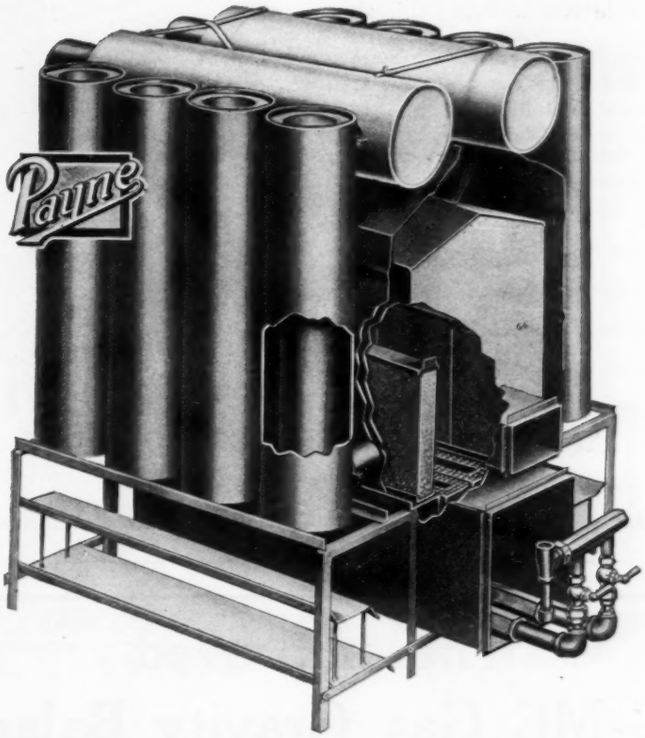
PERFECT Combustion, more active radiation . . . *perfect* *Gas Furnace Efficiency!*



Payne Central Furnace with cold air return—used in homes which are easily heated from one central source.

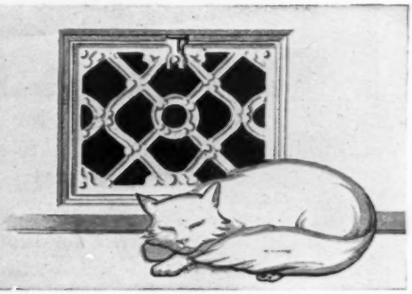


Battery of two Payne Unit Furnaces, each with cold air return—used to heat two separate rooms or two natural groups of rooms.



PAYNE GAS FURNACES make the most of the natural superiority of gas for fuel. Careful design and construction of firebox and burner insures perfect combustion. Heating elements have more active radiation surface—hence, greater heating capacity for the same amount of fuel. Rust-resisting ingot iron is used throughout, welded at all seams and joints—insuring absolutely gas-tight construction. Complete details will be sent gladly, on request.

PAYNE GAS FURNACES



Dealers

The Payne Gas Furnace Franchise for your town may be open. Write today for new Catalog and Proposition!

PAYNE FURNACE & SUPPLY CO., Inc.

Beverly Hills, California

There is a "Payne Heat" System for Every Building and Climate!

Payne Heat

Factory Units
Unit Furnaces
Floor Furnaces
Central Furnaces
Pipeless Wall Units
Industrial Installations

An Automatic Water Heater In Every Home

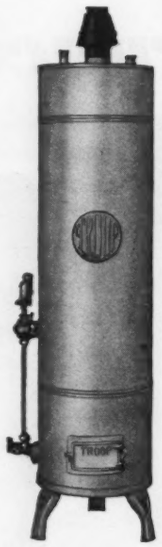
The TROOPER Automatic Storage Heater

will enable you to bring this about.

It can be sold to your customers for as low as **$55.00,** with a fine profit for yourself. Its low price will attract customers and its high quality will make the sale.

Notice these features never before offered in a low-priced storage heater:

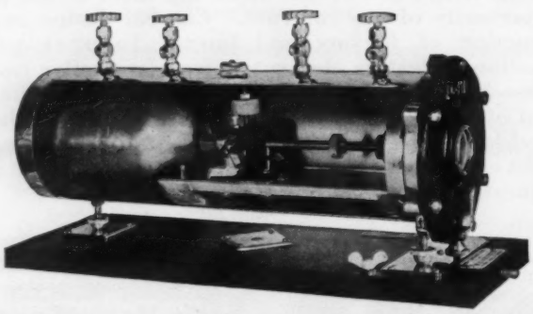
Heavy COP-R-LOY Tank,
Automatic Safety Pilot,
Guaranteed accurate Thermostat,
Heavy Insulation,
Brass Water Connections,
Ivory Enamel Finish.



TROOP WATER HEATER COMPANY
Pittsburgh, Pa.
Southern Office & Warehouse,
2625 Elm St., Dallas, Texas.
Branches in all Principal Cities.

The Improved AC-ME Gas Gravity Balance

Gives Accurate Consistent Results



Is Easily Portable in the Field

Adopted by the Natural Gasoline Association as the means for determining the specific gravity of Natural Gas

Ac-Me Specialties Mean AC-curate ME-asurement
Write for Bulletin No. 14

Largest Scientific Material House in Southwest

THE REFINERY SUPPLY COMPANY
621 E. 4th St.
Tulsa, Okla.
3404 Main St.,
Dallas, Tex.

CITIES SERVICE NOW CONTROLS FEDERAL LIGHT & TRACTION

Announcement was made on March 12 of the purchase by Cities Service Company of control of Federal Light & Traction Company, having headquarters in New York, and owning a controlling interest in 22 subsidiaries.

Total assets of the Federal Light & Traction Company were listed at $54,000,000 on December 31, 1929, and those of Cities Service Company were estimated as being in excess of $1,000,000,000 before the merger.

Among other utilities controlled by Federal Light & Traction are Trinidad Electric operating in Trinidad, Colorado, as well as in other southern Colorado towns and in northern New Mexico; Central Arkansas Railway and Light Corporation, which through subsidiaries serves gas, electric, street railway and water service at Hot Springs, Arkansas; Albuquerque Gas and Electric Company of Albuquerque, New Mexico; and the Tucson Gas, Electric Light & Power Company of Tucson, Arizona.

Federal Light & Traction Company was organized in 1910. E. N. Sanderson, president, was retained in that capacity.

MOORE BROTHERS CO. ISSUES CATALOG ON NEW SERIES

Moore Brothers Company recently announced a new series of gas ranges, in the company's catalog 48-G, featuring the "Hi-Lo-See" adjustable broiler drawer. The booklet is well illustrated with photographs and drawings of the full line of Moore Brothers Company products, including the 4-D and 5-A series. Copies of the brochure may be had by addressing the company at Joliet, Illinois.

FIRST GAS HOLDER STANDS AFTER 122 YEARS USE

After 122 years existence, the first gas holder ever built is still standing at Smethwick, England. The holder was erected in 1808 by William Murdoch, pioneer of the manufactured gas industry, who died in 1839. A bronze tablet was recently unveiled at Smethwick in his memory by the gas company now operating in that community.

F. A. ARNESEN GOES TO DALLAS FOR PITTSBURGH EQUITABLE

F. A. Arnesen, for the past 10 years connected with the Pittsburgh Equitable Meter Company, in Oklahoma and West Texas, has been transferred to the Dallas, Texas, office of the company as district manager. Offices are maintained by the company at 704 Republic Bank Building.

NEW MEMBERS FOR NATIONAL SAFETY COUNCIL ANNOUNCED

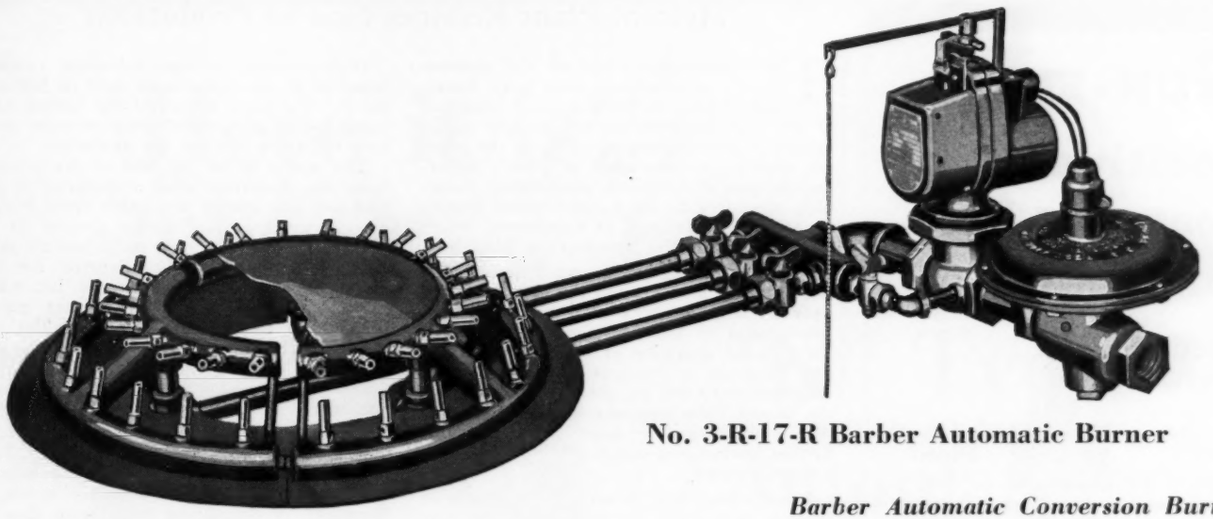
The Utilities Section of the National Safety Council announces the following new members in the Western territory: Louisiana Power & Light Co., Algiers, Louisiana; and Arkansas Natural Gas Corporation, Shreveport, Louisiana.

H. J. ROBERTS TO MANAGE GAS CORPORATION AT CONCORDIA

H. J. Roberts has recently been made manager of the Gas Corporation of Concordia, operating at Concordia, Kansas. He succeeds J. D. Polite.

GAS SERVICE CO. OPENS OFFICE AT MONETT, MISSOURI

Gas Service Company offices were opened at Monett, Mo., on Friday, March 14. Gas Service Company is a Cities Service subsidiary.



No. 3-R-17-R Barber Automatic Burner

Barber Automatic Conversion Burners, as illustrated above, are very moderately priced and available in four standard sizes for round Furnaces and Boilers with grate diameters from 16 to 31 inches, inclusive. Special Barber Automatic Burner Assemblies are specified and supplied for rectangular fireboxes.

Say to your prospects

"GIVE IT A TRIAL"

and learn why

BARBER *Automatic* JET GAS BURNERS

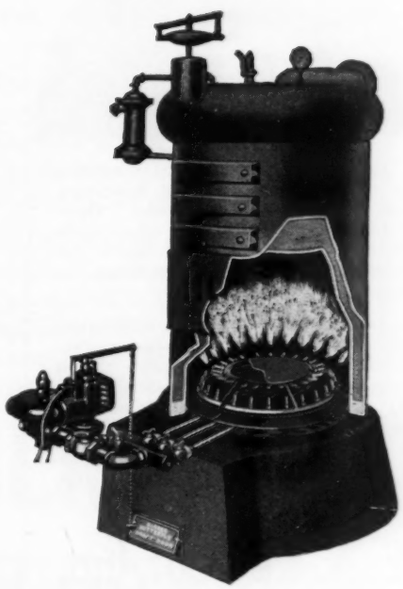
are best for closing sales

Because a Barber Automatic Burner can be installed so easily and quickly . . . through the clinker door opening on top of the grate bars . . . for a trial, or permanent installation. Better than words, it answers your prospect's questions about operating costs and satisfactory service.

Once installed, a Barber Automatic Burner is seldom removed. For your prospect never will want to return to the dirt and bother of tending a coal-burning furnace or boiler. At last he will know the joy and comfort of clean, healthy, uniform, carefree and efficient gas heat.

"Give it a trial" the same as several gas companies already are doing with excellent results. Making the proposition doubly attractive is the low price.

Write today for details and prices on the Highly Efficient Moderately Priced line of Barber Automatic Conversion Burners.

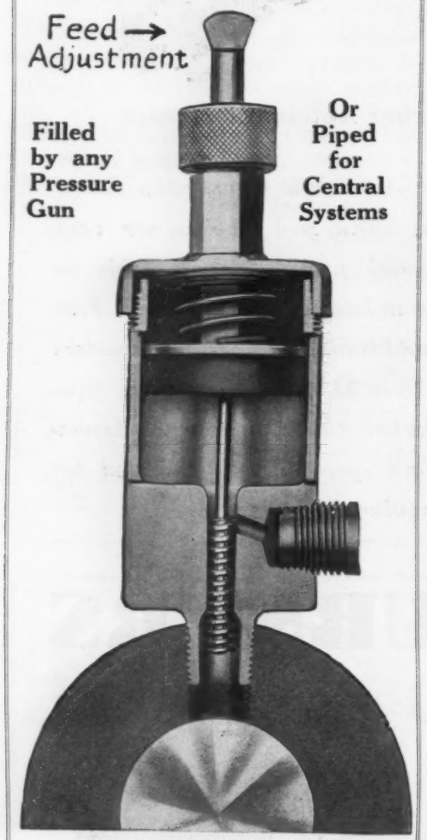


Showing how easily and quickly a Barber Automatic Jet Gas Burner can be installed through the clinker door opening on top of the grate bars for a trial installation.

The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3302-04 Superior Avenue, Cleveland, Ohio

GUN-FIL

Positive Controlled Feed Lubricator



Constant lubrication is essential to cool, smooth running bearings, and to overcoming wear. Gun-FILS always feed just what each bearing requires. No waste of lubricant or sloppy condition at bearing.

Individual adjustment and interchangeable valves permit accurate feed control of lubricants from cup greases to heavy oils. GUN-FILS are suited to all sizes and types of bearings.

Let GUN-FILS solve your bearing problems. Give them a trial.

Distributed by

E. A. Key Co., Inc.

2814 Santa Fe Ave.
Los Angeles, Calif.

Distributors in all principal cities.

Helium Plant Reduces Cost *of* Production

THE accomplishments of the government's new helium plant near Amarillo, Texas, in the continued reduction of the cost of producing helium and in attaining higher degrees of purity of the product, should have the effect of greatly lowering the cost of operating government dirigibles, according to the United States Bureau of Mines, Department of Commerce, which designed, built, and operates the plant.

Helium of high purity was produced at the Amarillo plant during the month of January in large quantity at a net cost to the government of $9.64 per thousand cubic feet. To date the operation of the Amarillo plant has been on a one-unit basis. When a larger output from the plant is required and the second unit, now nearing completion, is placed in operation, there will be a still further lowering of cost per unit of the product, it is stated.

After being shut down all of December because orders for the balance of the year were reduced below the minimum capacity of the plant, the Amarillo plant was operated 29½ days in January, and was again closed during all of February. January production was 1,052,680 cubic feet of the nonflammable gas, containing 97.85 per cent or 1,030,000 cubic feet of the element, helium. The gross operating costs, which represent the current expenditures made from the United States Treasury to operate and maintain the plant and gas field and to cover supervisory expenses in Washington, were $12,600.29, which is equivalent to $12.23 per thousand cubic feet of contained helium produced. Deducting the return to the Treasury from sale of residue gas from the gross costs, gives a net operating cost of $9,926.52 or $9.64 per thousand cubic feet of contained helium produced.

High-pressure storage cylinders recently installed at the plant were used in January for the first time, a part of the helium produced being placed in them because tank cars to handle it were not available.

The purity of 98 per cent of the product from the Amarillo plant, compared to the 95.4 per cent purity attainable from former sources, gives proportionately greater lift to the air ships. A 6,500,000 cubic foot air ship, like those now being constructed for the navy, has about five tons more lift when filled with helium of 98 per cent purity than when filled with helium of 95.4 per cent purity. Since the buoyancy of the gas must first lift the airship and its fuel, this additional lift due to increased purity of the gas is available for carrying cargo, passengers, or other "pay load."

Air gradually diffuses through the bags of an airship and contaminates the helium, thereby reducing its lift. This makes it necessary to deflate the bags from time to time and treat the gas in a purification plant. By inflating the bags initially with gas of high purity the period of service before purification is prolonged.

A third advantage of high purity is that it saves transportation and handling of the impurity, largely nitrogen, which is of no value as a lifting gas. In filling a 6,500,000 cubic foot airship, an increase in purity from 95.4 per cent to 98 per cent saves the transportation and handling of about 170,000 cubic feet of impurities. If shipments are being made in standard cylinders these impurities would require the handling, shipping, and return to the plant of about 950, or nearly two box car loads of cylinders. If shipments are being made in tank cars the impurities would occupy the equivalent of 85 per cent of the capacity of one tank car.

A.S.M.E. Research *for* Gas *and* Oil Industries

AS part of a plan which the American Society of Mechanical Engineers has under consideration by which it will actively participate in the development of mechanical engineering as applied to gas and oil field practice, a group of its national officers recently spent four days in making inspection trips over the Mid-Continent and in conference with leading executives of the industry.

The object of the four day conference as set forth by A. S. M. E. officers was to give the national officers of the organization a broader conception of the amount of mechanical equipment used in the industry, and the extent to which this apparatus fails to meet present needs and to establish the value of A. S. M. E. leadership through committee work, and through the formulation and revision of various codes, research, investigation, etc.

Under the direction of Thomas R. Weymouth, president of the Oklahoma Natural Gas Corporation, Arthur J. Kerr, chairman of the Mid-Continent section A. S. M. E., and William G. Heltzel, chairman of the National Petroleum Division of the A. S. M. E., visits were made to the Kelleyville Plant of the Oklahoma Natural Gas Corporation, the Pumping Station of the Sinclair Pipe Line Company at Hominy, Oklahoma, and to the properties of the Oklahoma Gas and Electric Company and of the Indian Territory Illuminating Company at Oklahoma City, Committees of the A. S. M. E. functioning in the Mid-Continent are: the Committee on Automatic Pumping Station Control, Committee on Analysis of Pipe Line Pumping Station Costs, Committee on Production which is inaugurating a long list of activities by making a study of prime movers for rotary drilling, Committee on Unfired Pressure Vessels, and the Committee on Gas Transportation which is directing its attention first to a study of compressors and compressor stations.

As a result of this visit it is anticipated that a Southwestern office of the A. S. M. E. will be established at Tulsa, with a field secretary in charge.

OKLAHOMA NATURAL TO SPEND $500,000 FOR IMPROVEMENTS

Improvements amounting to approximately $500,000, are to be made by the Oklahoma Natural Gas Corporation at Oklahoma City, during the year, according to press report. The expenditure will go into main extensions, enlargements and in the construction of new regulator stations.

J. C. BARNETT HAS NATURAL FRANCHISE AT MENARD

A 25-year franchise for the service of natural gas in Menard, Texas, has been granted to J. C. Barnett and associates. Gas will be piped from the fields near Callan City, Texas, should the franchise be granted.

Here it is!

The New Improved "K" Type AutomatiCook *with 5 great Features*

THE NEW "K" type AutomatiCook has five great features to make gas range selling easier for you. Here they are: (1) Handsome chromium plate finish. (2) Fully visible dial. (3) Fool-proof One-Minute Temperature Check. (4) Non-Clog by-pass. (5) Only *one* bolt attachment to range.

The new AutomatiCook is smaller, more handsome, more compact. It's better looking. There's a One-Minute Temperature Check. Every working part is accessible from outside of range.

More than 100 makes of the new ranges will be AutomatiCook equipped this year. Learn all about this greatly improved heat control now. Write for full descriptive literature . . . *today!* It might result in your selling more ranges this season.

ROBERTSHAW AutomatiCook

ROBERTSHAW THERMOSTAT COMPANY
Youngwood, Penna.

PLAY SAFE!

By Specifying and Using

"COLONIAL" BRAND

Re-Chrome Meter Leather

in your New Meters and Repair Work. This Leather will stand the Five-Minute Boiling Test.

This Trade Mark stamped on each New Zealand Lambskin is our guarantee to you that each skin has received the greatest care in its selection and tanning.

Besse, Osborn & Odell, Inc.

51 South Street, Boston — 177 William St., N. Y.

GMcB

Fire Brick

Set the Standard for Quality Refractories In the West

Gladding, McBean & Co.

San Francisco, Portland, Spokane — Los Angeles, Seattle, Oakland

California Oxide

GAS Purification Requirements can be most efficiently cared for through the additional and improved facilities of our new plant in Southgate.

Both Maas and McKee Oxides have met gas purification requirements of the Pacific Coast over a period of several years and merit your investigation.

California Oxide Co.

308 East Eighth Street
Los Angeles

TRinity 0769

ARCO COMPANY BUILDS PLANT AT LOS ANGELES

The Arco Company of Cleveland has selected Los Angeles as the location for its new paint plant to serve the Western, Latin American and the Oriental trade.

According to S. D. Wise, president, and S. D. Weil, vice-president, a survey of Western and export business conditions was responsible for the decision to construct a west coast plant.

The plant will consist of three brick buildings, with metal trim and concrete floor construction,, totaling 16,500 feet of floor space. The factory buildings will include a paint manufacturing plant 100 by 100 feet, a lacquer plant 50 by 100 feet and a varnish plant 30 by 60 feet. The new plant's output will include the company's complete line of paints, lacquers, varnishes and enamels.

The new factory will be known as the Arco Company Limited of California and will be under the general direction of Howard Wise. Howard Raeney will be general sales manager and E. B. Hagar, who has been manager of the San Francisco branch will be made district manager with headquarters in Los Angeles. In addition to the Los Angeles plant the Arco Company operates factories in Cleveland, Ohio; and in Toronto, Ontario, Canada.

NEW BULLETIN FEATURES NAYLOR SPIRALWELD PIPE

Naylor Pipe Company of Chicago, Illinois, has recently brought from the press Bulletin No. 30-1, describing the company's product, and featuring Naylor Spiralweld pipe. The booklet is profusely illustrated with pipe line construction scenes, cross sectional views, and views taken in the company's yards. Copies may be secured by writing to the main office of the company at 1230 E. 92nd Street, Chicago, Ill.

NATURAL GASOLINE MANUFACTURE SHOWS 23 PER CENT GAIN

A preliminary report of the United States Bureau of Mines states that the output of natural gasoline in 1929 was 2,195,400,000 gallons as compared with 1,777,700,000 gallons in 1928, a gain of 23 per cent. The major portion of the increase was recorded in the California fields, particularly at Santa Fe Springs, although the Greater Seminole area recorded a somewhat surprising increase of nearly 100,000,000 gallons.

CITIES SERVICE GAS CO. SUPPLIES BARTLESVILLE WEATHER REPORT

The Pressure Department of Cities Service Gas Company at Bartlesville, Oklahoma, supplies weather reports for publication in the Bartlesville newspapers. The figures which are taken from the pressure department's chart written by a recording thermometer above the roof of the company office building are used as official figures

H. F. GOODENOUGH ON PACIFIC COAST IN MARCH

H. F. Goodenough, chief engineer and representative of the manufacturing division of the Refinery Supply Company of Tulsa, Oklahoma, made a trip to the Pacific Coast in March for the purpose of attending the Oil Equipment and Engineering Exposition in Los Angeles on March 16 to 23.

THOS. W. STONE MAKES PACIFIC COAST TRIP FOR COMPANY

Thos. W. Stone, vice-president of the Western Gas Construction Company of Fort Wayne, Indiana, was on the Pacific Coast in March in the interest of his company.

WEDGEWOOD

GAS RANGES

Strike a New Style Note!

NEW style and color charm in the WEDGEWOOD Line is attracting unusual attention just now.

Those who sell Wedgewood Gas Ranges have enthused over these new modern creations and welcomed them on their floors.

Added style and beauty add to their sales appeal and help move the old stove out of the kitchen.

And, remember, there is a Wedgewood for every family need and to fit every purse.

New irresistible color combinations of pastel green and soft ivory.

Wonderful new WEDGEWOOD Gas Range creations with every new mechanical feature designed for easy kitchen work and economy. Stainless, rust-proof enameled cooking tops, porcelain oven linings, oven heat control and with or without kitchen heater.

To the woman who demands beauty, cleanliness, convenience and efficiency in her home, these new WEDGEWOOD Gas Ranges sell themselves quickly.

Have Your Friends Listen to the Wedgewood Cooking Talks

By ANN HOLDEN—Every Tuesday morning at 11:10 o'clock. Thousands are securing wonderful cooking helps from these recipes.

KGO, KPO, KFI, KGW, KOMO, KHQ, KSL

Quality-Service Since 1882

JAMES GRAHAM MFG. CO.
LARGEST STOVE MANUFACTURERS IN THE WEST
GAS RANGES - COMBINATION RANGES - RESTAURANT RANGES
GAS PLATES - WATER HEATERS - ROOM HEATERS
San Francisco Los Angeles Newark, Calif.

A Wedgewood For Every Purse

OVER A MILLION WEDGEWOOD RANGES IN USE!

EMPIRE
Oil Meters

Positive Displacement
Oscillating Piston Type

Simple in Construction—Easy to Operate—Low in Cost of Maintenance

EMPIRE meters are highly accurate, and **stay** accurate. They are invaluable for cracking and absorption processes; for gas companies; for refiners and distributors of gasoline and all distillates of petroleum; for measurement of crude oil, cold or hot.

ALL SIZES ½" TO 6"

Standard meters will withstand working pressures of 150 lbs. to the square inch. High pressure types will handle 325 lbs. Higher pressures and special types to order.

National Meter Company

299 Broadway, New York

1048 Folsom Street, San Francisco **2309 E. 8th Street, Los Angeles**

We Manufacture a Full Line of Strictly

High Grade Gas Appliances

Including

Conversion Gas Burners
Circular Heaters
Warm Air Furnaces
Gas Ranges

Our Catalog is yours for the asking

SECURITY STOVE & MFG. CO.

Kansas City, Mo.

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $5.00 monthly on 12-time contract.

SITUATION WANTED—MALE

A sales representative of a public utility seeks a change wherein he can find a greater opportunity. The applicant has had a well rounded business career, including office management, finance and sales. Address Box E-21, care of *Western Gas*, 124 West Fourth Street, Los Angeles, California.

WANTED—Industrial gas engineer having seven years experience designing industrial furnace equipment for high and low B.t.u. gases desires position with manufacturer or utility on engineering or sales. Address Box E-21, *Western Gas*, 124 West Fourth Street, Los Angeles, California.

WANTED—SALES REPRESENTATIVES and distributors by Eastern manufacturer. A new gas range accessory that offers a good proposition. Address Box E-66, *Western Gas*, 124 West Fourth Street, Los Angeles, California.

WANTED—Married man 30 years of age, general office man, desires connection with gas company in Oklahoma or Texas. Reference if desired. Address Box B-77, *Western Gas*, 124 West Fourth Street, Los Angeles, California.

CLEVELAND TRENCHER ISSUES CATALOG ON CO. PRODUCTS

The Cleveland Trencher Company catalog No. 10, covering all machines and products manufactured and sold by this company, is now off the press.

The products covered in the catalog are the company's "baby" digger, pioneer, tamper-backfiller, curb digger, trailers, and Penote sectional steel manhole forms and accessories for underground conduit work.

The book covers all phases of the machines and equipment produced by the Cleveland Trencher Company. One feature of this catalog is illustrative material which shows the construction and technical details of the machines and products as well as the application of the different machines. This book also includes specifications of the company's products.

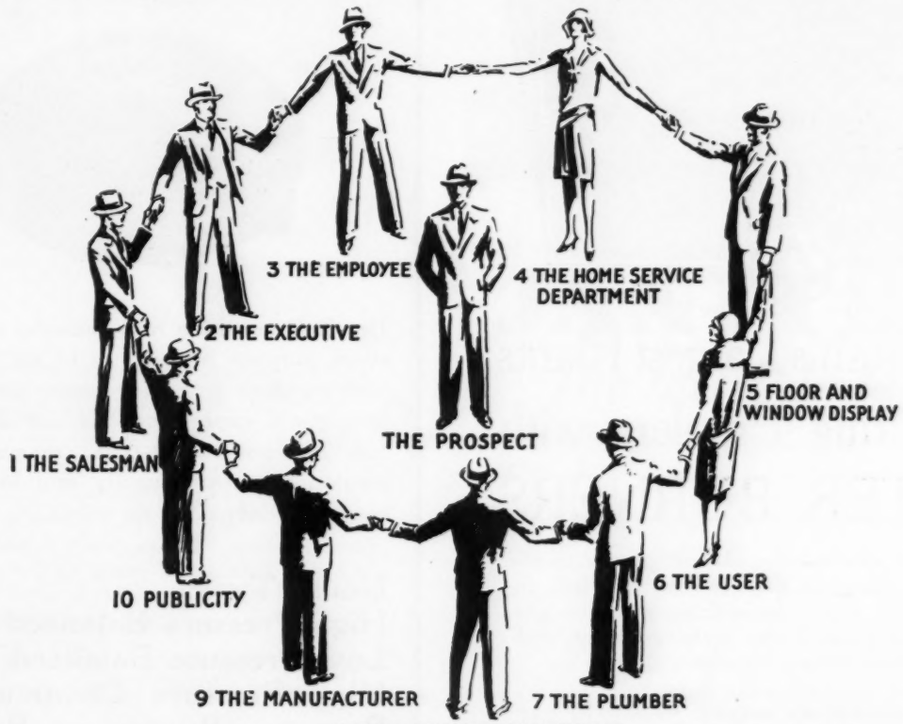
Copies may be secured by addressing the Cleveland Trencher Company at 20100 St. Clair Avenue, Cleveland, Ohio.

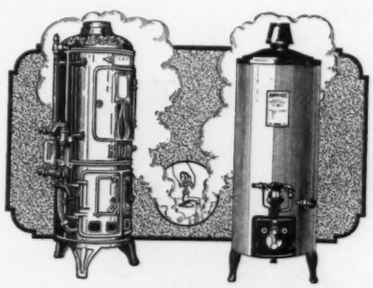
RAY PRINDLE GOES WITH SOUTHERN CITIES DISTRIBUTING COMPANY

Ray Prindle of Webb City, Missouri, has been named distribution engineer for the Southern Cities Distributing Company with headquarters at Shreveport, Louisiana.

SELLING

is an organization responsibility





The RUUD $95 Twins

Two popular leaders of the RUUD Quality Line that consists of a hundred types, sizes and combinations.

Talk about sales—use high-sounding phrases if you will—make charts and draw diagrams and this fact remains as fundamental:

You must find and sell the PROSPECT!

If he doesn't believe that hot water is a vital service that should be supplied in modern fashion, you'll never sell him an automatic water heater even if you price them at a dime a dozen.

The TEN TO ONE plan is built around your organization as a unit. It sells HOT WATER first,—then the quality machine that supplies it.

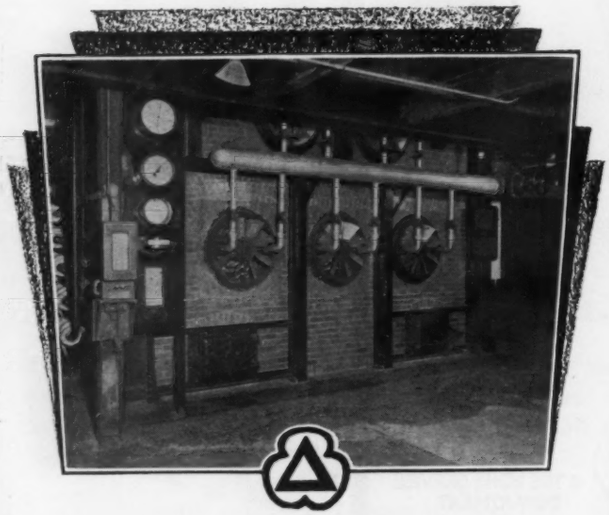
RUUD MANUFACTURING COMPANY

Pittsburgh, Penna.

LOS ANGELES SAN FRANCISCO PORTLAND DENVER
DALLAS FORT WORTH SAN ANTONIO HOUSTON
OKLAHOMA CITY NEW ORLEANS KANSAS CITY ST. LOUIS

RUUD QUALITY

WEBSTER Radiant Gas Burners



One of South's Largest Plants Solves Firing Problem with WEBSTER BURNERS

It is a boiler in one of the largest plants in the South. It uses shavings and sawdust as fuel in combination with gas. Sometimes it burns gas alone — sometimes it burns only sawdust and shavings.

Such an installation usually results in gas burners melting down in a very short time due to the terrific punishment of excessive heat.

But the five Webster Radiant Gas Burners which are installed have not burned out because they are equipped with refractory faces.

The job was installed by a well known gas company under the direction of Webster engineers and added a mighty fine gas load as well as another satisfied customer.

Whether yours be a simple installation or a complicated job such as that described above, you will find Webster men ready to cooperate in every way to give Satisfaction and Economy.

Write us—we will be glad to explain Webster Radiant Gas Burners and the service behind them — you will be interested.

The Webster Engineering Co.
TULSA - OKLA.
Boiler Burner Division of
The Surface Combustion Co.
Subsidiary of Henry L. Doherty & Co
2375 DORR STREET TOLEDO OHIO
Branch Offices in All Principal Cities
Member of Industrial Furnace Manufacturers Association

Reliance Regulators

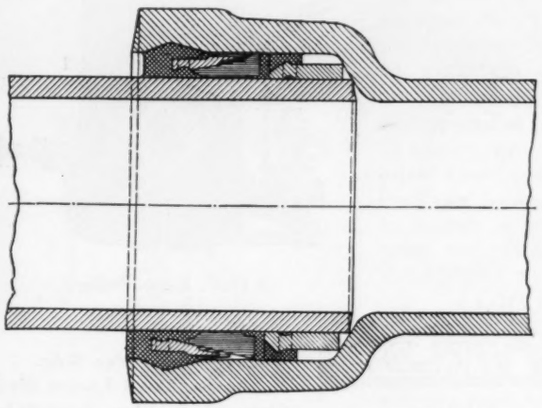
The Reliance Line now includes a regulator for every purpose in sizes up to six inches, all embodying their patented toggle joint action. Fifteen years experience has proven conclusively that for positive lockup, sensitive and close regulation, great capacity and low cost of upkeep, this device has no equal.

House Type
High Pressure Balanced Valve
Low Pressure Balanced Valve
High Pressure Compounding
Propane, Butane or Bottled Gas

Reliance Manufacturing Co.
Alhambra, California

"Pacific Pipe's FLEXPAN Joints Held Gas

when other pipe was pulling apart—"



—So reports a western gas executive, of recent sub-zero weather. Contraction caused joint-leaks in other kinds of pipe, but mains laid with McWANE-PACIFIC CAST IRON PIPE with FLEXPAN JOINTS **held the gas.**

Line deflections, the heave and pull of frost—whatever happens, the FLEXPANS **hold the gas.**

At last—with FLEXPAN JOINTS—you can use CAST IRON PIPE, the **only** victor over corrosion. An end to coating and coddling your mains, too.

McWANE-PACIFIC Cast Iron Pipe has a resilience you never knew existed—made of close-grained, tough, easily cut iron that "serves by the century" at low cost per foot and *lowest* cost per year.

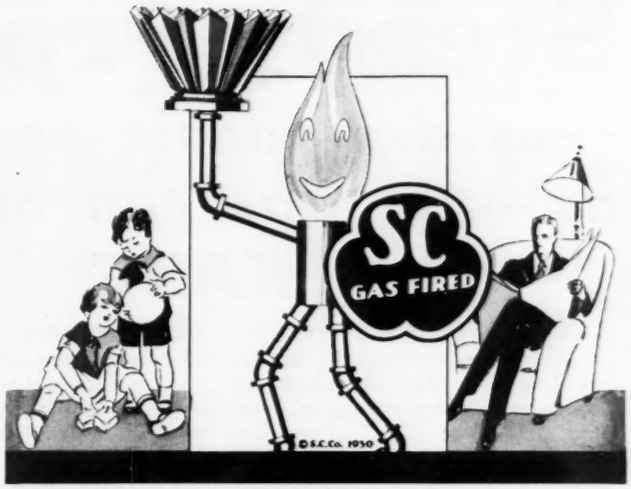
Before buying another foot of ANY kind of pipe, investigate McWANE-PACIFIC FLEX-PAN—the pipe that made high gas pressures possible with cast iron (permanent) pipe. (Warranted to hold 100 lbs. pressures.) Sizes now available, 1¼, 2, 3, 4, 6, and 8 inches.

Pacific States Cast Iron Pipe Co.

San Francisco, Los Angeles, Portland, Denver, Salt Lake

McWane Cast Iron Pipe Co.

BIRMINGHAM, PHILADELPHIA, CHICAGO, DALLAS



THIS IS JANITROL

The Invisible Janitor

He is now being enthusiastically used by over 20,000 families, giving complete satisfaction to more than 130 of the leading gas companies . . . a tried and true gas burner with unlimited profit possibilities.

(1) **JANITROL is the greatest domestic load building appliance.**

(2) **JANITROL is the lowest priced completely automatic, quality burner.**

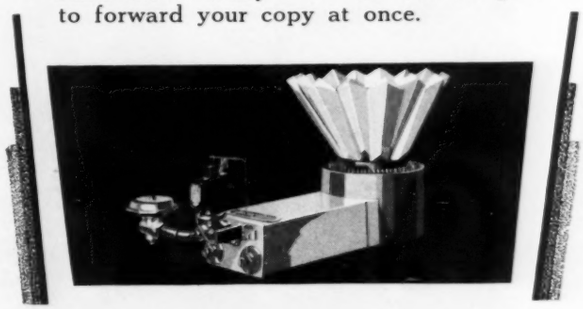
(3) **JANITROL paves the way for future sales of complete gas fired equipment . . . it "sells" gas as a fuel.**

(4) **JANITROL comes to you completely assembled . . . it is the easiest to install.**

(5) **JANITROL is listed as standard by the underwriters' Laboratories.**

(6) **JANITROL is backed by an efficient sales and service organization constantly at your command.**

Have you a copy of the new Spring JANITROL Merchandising Plan? . . . . Send for it today . . . we will be glad to forward your copy at once.



The Surface Combustion Co.

INCORPORATED

Subsidiary of Henry L. Doherty & Co.

2375 DORR STREET, TOLEDO, OHIO

Branch Offices in All Principal Cities

Mantle Recuperator Division — METALLIC RECUPERATORS

Webster Engineering Co. — WEBSTER BOILER BURNERS

Member of Industrial Furnace Manufacturers Association

Steady Process Steam

—as dependable and Clean as only Gas can make it!

KANE

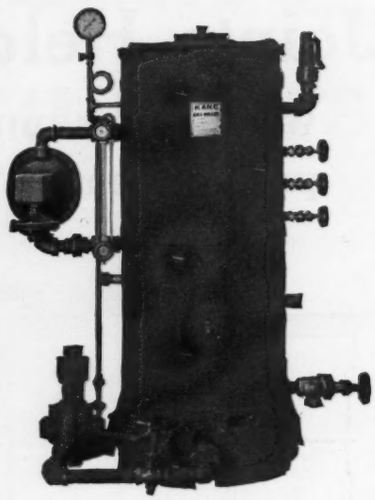
With the automatic gas-fired KANE process steam boiler, steam is clean and abundant for processes and unvarying in pressure.

Gas is burned only in proportion to steam needs, because the boiler is equipped with automatic control.

There are neither bunkerage nor ash disposal problems, and no labor of firing, or delays—with a KANE.

More—long pipe lines are expensive and wasteful; these are eliminated with the Kane, because the boiler makes a compact installation within a few feet of processes.

These are more than selling points —they are facts, of importance to every process steam user who knows the economies of gas fuel . . . and there is a range of sizes up to 30 H. P. for your needs. **Write us,** or CONSULT YOUR GAS COMPANY!



3 H. P. Kane Boiler

New York—9 Park Place
Boston—100 Arlington St.
Chicago—363 W. Erie St.

MEARS-KANE-OFELDT INC.
1903-1915 EAST HAGERT ST. PHILADELPHIA

Buffalo—Walbridge Bldg.
St. Louis—2010 Locust Blvd.
Birmingham—Am. Trust Bldg.

Makers of Automatic Gas Boilers for Over a Quarter of a Century

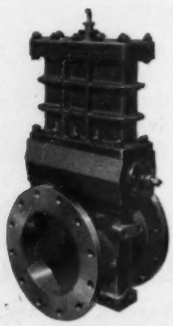
---

BLAZING THE TRAIL

Every forest is trackless and difficult to penetrate until the Trail Blazer has shown the way. And so it is in the various industries. For years the measurement of gas, air, oil and water in large volumes was a difficult problem and accomplished in a hit or miss manner. Then a Trail Blazer offered the orifice meter, but it used the cumbersome by-pass, which left much to be desired.

Anson Robinson completed the blazing of this particular industrial trail with the Robinson Orifice Fitting, which has effected enormous savings to the industry in both material and time. In the majority of cases it eliminates all need of a by-pass; makes orifice plate changing simple and easy, and encourages the frequent inspection necessary for correct measurement. It occupies a minimum of space, the orifice is always centered, and further, there is no hazard when used on a gas line, for no gas can leak.

The Robinson Orifice Fitting is broadly protected by the U. S. Patent No. 1569305.



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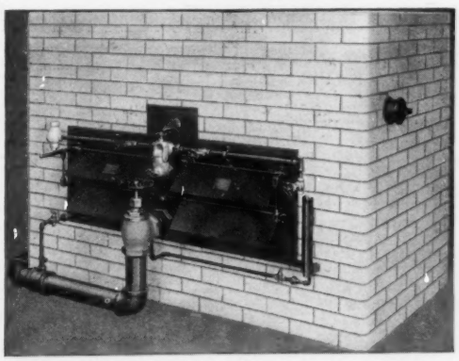
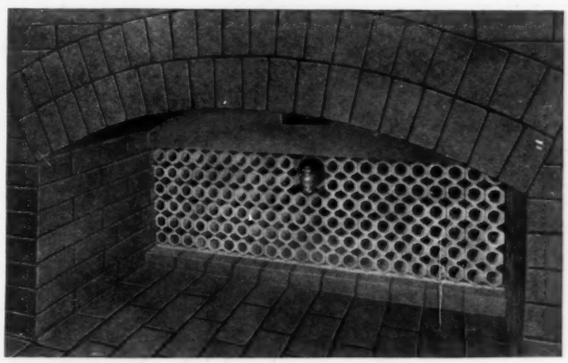


Front View—Showing Installation of Combination Gas and Oil Unit.



Rear View—Same Installation—Note All Parts of Gas Burner Exposed to Radiant Heat or Oil Burner Flame are Protected by Refractories, Insuring Long Life.

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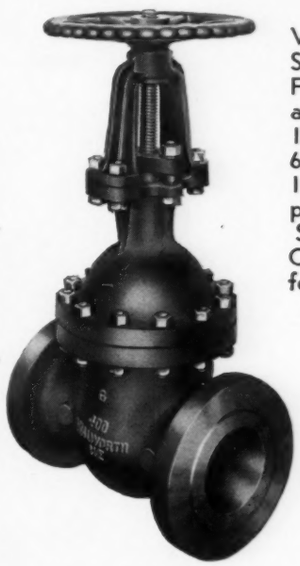

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